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Evaluating the preparedness of college/university-trained graduates entering the landscape contracting industry : a needs assessment

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Evaluating the preparedness of college/university-trained graduates entering the landscape contracting industry: A needs assessment

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CHAPTER 1. GENERAL INTRODUCTION

Introduction

Every year across the United States, landscape contracting students graduate from horticulture (or similar) departments of postsecondary institutions and begin careers with companies providing landscape maintenance, landscape construction, and/or design-build services. During their two and/or four-year landscape contracting programs these students experience a variety of curricula, teaching methods, and faculty expertise. The intent of this study was not to discuss the strengths or weaknesses of different pedagogies. Instead, my interest was focused on the perceptions and opinions of landscape contracting decision-makers regarding the current effectiveness and future direction of landscape contracting programs offered by postsecondary institutions in the U.S.

The idea for this study stemmed from my educational experiences as a graduate of the landscape contracting program in the Department of Horticulture at Penn State University and my subsequent three and one-half years of work experience in the landscape management segment of the green industry. I perceived, as did many of my managerial colleagues, that many employees recruited from colleges and universities entered the workforce with little or no business knowledge/training. Certainly, not all landscape contracting firms assign the same importance to this deficiency, but I did become aware of cases where managers purposely interviewed and hired graduates with degrees in business, believing horticultural concepts are easier to teach than skills needed to operate a business or manage employees (M. Bogan, personal communication).

Historical Context

Horticulture, the cultivation of plants, can be dated back 20,000 to 27,000 years when artifacts clearly show Cro-Magnons gathered special plants, extracted fibers, and manufactured useful articles to better their lives (Janick, 2002). The practice of planning and designing open spaces, waterways, and strategic plantings has been around since the mysterious Hanging Gardens of Babylon in 6th century B.C. and the private Chinese gardens of 4th century A.D. (Richmond and Richmond, 2004). Yet, it was less than 200 years ago (1828) that the term 'landscape architect' was developed. While Frederick Law Olmsted was the first person to adopt the professional title of landscape architect, it was a British citizen by the name of Patrick Geddes who is credited with inventing the term landscape architect (Turner, 1998). Throughout the past 200 years, horticulturists and landscape architects have transformed countless spaces through the creative use of topography, plant material, buildings, water, and nature.

As the demand grew for landscape architecture and horticultural services in the 20th century, a new opportunity developed. Professional practitioners were needed to blend the fields of horticulture and landscape architecture. In the late 1960's, Mississippi State University (MSU) was the first school to offer a solution to this new opportunity. Working cooperatively with the Department of Horticulture and Landscape Architecture at MSU, Robert A. Callaway, then head of Campus Landscape and Retail Floral Management, incorporated business courses into a mix of horticulture and landscape architecture curricula to develop the first landscape contracting program (Associated Landscape Contractors of America, 2003). The new program at MSU was developed to train professionals who would

be qualified to install the designs of landscape architects and to maintain the desired effects indefinitely.

State of the Industry

The landscape contracting industry (lawn care, landscape installation, landscape design, and tree care) experienced an average annual growth rate of 20% from 1997 to 2004 increasing (Associated Landscape Contractors of America, 2004) from $14 billion in 1997 to $42 billion in 2002 (300% increase). In 2002, the North American Industry Classification System (NAICS 561730) identified more than 145,000 businesses in the United States providing landscaping services, including; (1) firms primarily engaged in providing landscape care and maintenance services and/or installing trees, shrubs, plants, lawns, or gardens and (2) firms primarily engaged in providing the aforementioned services along with the landscape design services and/or the construction (i.e., installation) of walkways, retaining walls, decks, fences, ponds, and similar structures (U.S. Census Bureau, 2002). To make these businesses operate, it was estimated in 2002 that more than 700,000 persons are employed in the lawn and landscape market in the U.S. (The University of Georgia, 2002).

Landscape Management magazine contributes a current assessment of the landscape contracting segment of the green industry in their *2003 State of the Industry Report: Times of opportunity, uncertainty*. Of the 374 companies surveyed, 75% report having more work in 2003 than in 2002 and 68% report having more revenue in 2003 than in 2002 (Hall, 2003). Respondents also reported "availability of labor" and "developing supervisors" as two of their biggest challenges (Hall, 2003). Regardless of the struggle to find and develop employees, 72% of respondents reported their employees were "very" or "mostly" satisfied

and well rewarded in their company (Hall, 2003). More recently, *Lawn and Landscape* published the *2004 State of the Industry Report* after receiving 742 completed surveys from industry members. They found a large percentage (84%) of respondents believed their total gross sales revenue would increase in 2004, compared with 57.4% in 2003 and 59% in 2002 (Wisniewski, 2004).

The landscape contracting industry has exhibited substantial growth and economic strength in the past decade despite a fluctuating economy. This industry will continue to demand a plentiful supply of qualified employees, including postsecondary graduates, to keep up with the average 20% annual growth rate (Associated Landscape Contractors of America, 2004).

Research Objectives

The specific objectives of my research study were:

1. Assess the perceptions of landscape contracting decision-makers regarding the overall efficacy of landscape contracting programs and their ability to prepare students for careers in the green industry.
2. Characterize the opinions of landscape contracting decision-makers regarding business training and its relative importance as a component of landscape contracting curricula at two and/or four year programs across the U.S..

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CHAPTER 2. LITERATURE REVIEW

Needs Assessment

The term needs assessment has been defined many times, especially after the popularity of the term grew in the 1980's. At a basic level, needs assessments are tools designed to identify the desires to achieve more satisfactory lives of a particular group of persons (Reviere et al., 1996). Older definitions simplistically defined needs assessment as a method of data collection or population description (Reviere et al., 1996). A more recent approach defines needs assessment as a "systematic and ongoing process of providing usable and useful information about the needs of the target population – to those who can and will utilize it to make judgments about policy and programs" (Reviere et al., 1996). Needs assessment are population-specific, systemically focused, empirically based, and outcome-oriented (Reviere et al., 1996).

Many researchers use the terms assessment and evaluation interchangeably, while others view assessment as student learning, knowledge, skills and outcomes; and evaluation as the process of determining the worth or merit of an activity, program, person, or product (Davis, 1989). The important point to remember, no matter what definition is used, is that postsecondary researchers of needs assessment are trying to understand and judge the merit and worth of higher education. Postsecondary institutions need to provide value to students and properly prepare them for a future career in their chosen field (Graham, 2001).

Necessity of needs assessment

In the competitive environment of higher education and with continued pressure from the public to provide a useful, practical, and valuable education for the money, postsecondary budgets continue to tighten (Andelt et al., 1997). And, during times of budget shortfalls, needs assessments may no longer be considered a priority. But, data acquired from needs assessments are necessary to help postsecondary institutions make educated decisions in planning future programs, reallocating current resources, and trimming excess weight to reach maximum efficiencies in outdated programs (Reviere et al., 1996). Needs assessments act as a constant reminder to postsecondary institutions of their obligation to society, particularly with respect to the education of young adults who will provide the leadership in the future (Banta et al., 1996).

Implementing needs assessment

There is no standardized methodology or guiding theory that exists for departments to follow in implementing a needs assessment (Reviere et al., 1996). In an attempt to provide some guidelines, the American Association for Higher Education (AAHE) established an Assessment Forum in the 1990's to develop a set of assessment principles. The final AAHE report provided the following "Principles of Good Practice for Assessing Student Learning" (American Association for Higher Education, 1992):

1. The assessment of student learning begins with educational values.
2. Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time.
3. Assessment works best when the program has clear, explicitly stated purposes.

4. Assessment requires attention to outcomes but also and equally to the experiences that lead to those outcomes.
5. Assessment works best when it is ongoing, not episodic.
6. Assessment fosters wider improvement when representatives from across the educational community are involved.
7. Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.
8. Assessment is most likely to lead to improvement when it is part of a larger set of conditions that promote change.
9. Through assessment, educators meet responsibilities to students and to the public.

Stakeholders

Assessment stakeholders can include faculty, administrators, staff, current students, alumni, employers, and business/trade associations (Ahlgren and Palladino, 2000; Scales et al., 1998). Incorporating stakeholders in the initial stages of defining, targeting, and carrying out the assessment is crucial so that the stakeholder's cooperation follows through to the implementation phases of suggested changes (Reviere et al., 1996). The phase of implementing needs assessment findings to change existing programs is often ignored, forgotten about, or simply denied. Too often, needs assessment findings are treated as ends in themselves, not as essential means to an end.

Examination of published needs assessments often reveal findings and statistical analysis, but little comment on the policy and practical implication of the findings (Kimmel, 1977). In a study of needs assessments performed from the late 1970's through 1989, it was found most authors provided little information on the application or outcome of the study

(Newcomer, 1997). Researcher also found evaluators typically spend 95% of their time conducting a study and 5% of their time writing recommendations, whereas their audience typically spends 95% of their time reading the recommendations (Carter, 1996). With minimal or no discussion of the implication for application, policy, or action, readers often are left to question if there is any purpose to the needs assessment.

Assessment in engineering

An increasingly important stakeholder group is employers, especially when the mission of the postsecondary unit is to prepare workers for immediate employment in technical fields (Banta et al., 1996). In engineering, the importance of employer satisfaction with graduates is so crucial that the Accreditation Board for Engineering and Technology (ABET) made industry assessments a requirement for programs seeking accreditation (Van Dyke and Williams, 1996).

Part of the mission of every postsecondary institution is to prepare graduates for employment in their chosen field (Graham, 2001). Landscape contracting, like engineering, requires applied and technical knowledge to be taught in undergraduate curricula. Thus, the discipline of landscape contracting could benefit from reviewing the techniques used in the following examples of engineering programs meeting the assessment requirements of ABET Engineering Criteria 2000.

Faculty at Clemson University used seven different outcome indicators to help meet assessment requirements (Scales et al., 1998). The indicators included alumni mail surveys, a capstone design course, employer mail surveys, senior exit interviews, the standardized Fundamentals of Engineering examination, standardized test such as the GRE or GMAT, and an industrial advisory board (Scales et al., 1998). The goal of the study was to choose a

strong mix of indicators that will help the assessment requirements and strengthen Clemson's Department of Industrial Engineering. The researchers concluded that their study helped learn more about using outcome indicators, but much work still needs to be done before "best-in-class indicators" could be chosen for outcome assessments (Scales et al., 1998).

Using a customary practice in engineering schools, researchers from Hofstra University conducted graduate surveys, which provide a measure of their programs' success in preparing students for the workplace (Puerzer and Rooney, 2002). The assessment requirements of ABET influenced the researchers to use alumni feedback to strengthen a program by increasing the responsiveness to industry needs (Puerzer and Rooney, 2002). The presumption was graduates with some post-graduate experience have gained a perspective that allows them to reflect on the strengths and weaknesses of their undergraduate program (Puerzer and Rooney, 2002). The researchers concluded that once alumni have helped highlight a problem, a coherent plan is needed to enhance educational programs in those areas and additional future alumni surveys are needed to determine whether successful action has been taken (Puerzer and Rooney, 2002).

In another study, researchers examined practices for involving industry in assessment processes at fifteen NSF supported Engineering Education Coalitions Program schools that emphasized assessment and program evaluation (McMartin and McGourty, 1999). It was found that although most schools reported having an industry advisory board, the role of those boards tended to be limited, especially when discussing recommendations or decisions (McMartin and McGourty, 1999). It was apparent to the researchers that faculty did not trust the opinions of employers and prematurely assumed any comment from industry would be focused on vocational or employability needs. Contrary to the assumptions of faculty, when

industry was involved as a partner rather than a sounding board, industry representatives contributed recommendations without vocational direction (McMartin and McGourty, 1999). In this case industry members did not pretend to understand the specifics of curriculum development, but their understanding of the required skills and knowledge needed to overcome workforce challenges made their opinions and insight invaluable (Poling and Ikenberry, 1997). "When industry involvement is structured properly, practitioners can add a great deal of value to such assessment activities as the definition of student learning outcomes and the review of program plans" (McMartin and McGourty, 1999).

Assessment in agriculture

The accreditation requirements for ABET have a strong emphasis on assessment. In agriculture, specifically landscape contracting, there is no governing body with responsibilities similar to ABET. Yet, there are many postsecondary agriculture programs across the U.S. that recognize a benefit of assessing the needs of industry.

A survey of Virginia's commercial greenhouse industry in 2000-01 assisted Virginia Tech Horticulture faculty in planning educational and research programs (Scoggins et al., 2004). The two primary topics of interest were production techniques and issues impacting the business of growers in Virginia (Scoggins et al., 2004). The top two issues facing Virginia greenhouse growers were dealing with the topics of marketing and financial management. Virginia Tech faculty used the results to improve their horticulture program.

Faculty from the University of Nebraska-Lincoln conducted an employer assessment of the skill preparation of graduates. Students were believed to be unprepared to fulfill the needs of employers in terms of knowledge, competencies, skills and abilities (Andelt et al., 1997). The researchers concluded industry members perceive the importance of technical

subject matter, but current and future student training should focus more on communication, leadership, interpersonal competence and computer skills (Andelt et al., 1997). The researchers also felt colleges must be sensitive to the needs of the employers by conducting industry needs assessments every three to five years (Andelt et al., 1997).

Finally, researchers from The Pennsylvania State University examined the perceptions of employees and students in agribusiness regarding skills and experiences needed for pursuing a variety of careers in agribusiness (Radhakrishna and Bruening, 1994). The results indicated both employees and students perceived interpersonal skills, communication skills, business skills, and economic skills are very important when pursuing careers in agribusiness (Radhakrishna and Bruening, 1994). The researchers also emphasized the importance of a relationship between industry and higher education to help students prepare for workforce expectations (Radhakrishna and Bruening, 1994).

Industry and Higher Education

There are arguments and discussions over what role industry should play in postsecondary institutions (Lynton, 1984). In the book *Linking Schools and Industry*, Bradshaw (1989) described part of the missing link between education and industry from two viewpoints; 1) Many teachers have made a deliberate decision not to work in industry or have rejected it after a period of time and therefore adopt a set of preconceived ideas and assumptions based on media images of management and unions, 2) Industry members also have preconceived notions about education and base their ideas on their personal experience or their occasional visits to schools.

Looking back at the history of higher education, some researchers believe universities and colleges exist because of industry's need for skilled workers (Wright, 1990). In support of that viewpoint, it has been argued that medieval universities were developed upon the need to train clerics, British 'Red Brick' universities formed around the industrial needs of Britain, and the American Land Grant institution was created in response to the agriculture concerns of America (Wright, 1990). Regardless of why postsecondary institutions were developed, both higher education and industry seek educated graduates to provide future economic leadership. Thus, higher education and industry naturally complement one another.

There is a great potential benefit of a long-term working relationship between higher education and industry. Some believe it is important to recognize and capitalize on the differences between industry and higher education, as opposed to brushing differences aside, which can lead to superficial camaraderie with no real productive working partnership (Marsden, 1989). Bailey (1990) emphasized this point when she stated,

> "Let us remember the old adage, 'united we stand, divided we fall' – so it is with the industry and education partnership. Separately we may flounder and struggle; together we have the potential to achieve so much– a strong base from which tomorrow's employees will be able to grow and develop. That will help to build a successful future for us all."

Education vs. training

Industry and higher education often debate over providing education or training to students of postsecondary institutions. Some experts feel graduates benefit most from a liberal arts education, coupled with specific courses in technology, therefore providing a mix

of education and training (Oblinger and Verville, 1998). Others believe the highest salaries are paid to those with specific skills needed for a high technology economy and put less importance on a general liberal arts education (Oblinger and Verville, 1998).

Sternberg (1996) argues that higher education has an unbalanced expectation of students' analytical intelligence and creative intelligence. Many classes at postsecondary institutions concentrate on the first level of learning, knowledge. Some believe that a beneficial education prepares students to live in a world where what matters is creative intelligence, not just inert, analytical intelligence (Sternberg, 1996). While analytical intelligence is important to understand the basis of any topic, creative and successful intelligence may be more useful to students in their future careers (Sternberg, 1996). Oblinger and Verville (1998) sum up Sternberg's ideas on analytical and creative intelligence in the following discussion:

> "In virtually any business or industry forum focused on business needs, there is discussion of creativity and of the ability to get along....We misprepare students if they are allowed to believe that analytical intelligence will be the most important thing in life. While it may be critical to 'making the grade', many academic problems are dislocated from people's ordinary experience. How many times have you had to solve a verbal-analogy problem like EVANESCENT: FLEETING:: EPHEMERAL?... There are many more realistic problems we can encourage students to solve."

Regardless of academic discipline, problem solving experiences are important for graduating students. Some experts believe higher education should concentrate on problem-

solving skills in learners because being able to take an unstructured problem and solve it is the common denominator in many professional careers (Oblinger and Verville, 1998).

Spanning the chasm

In 1994 the Business-Higher Education Forum, in cooperation with the American Council on Education, established a task force on high-performance work and workers in an attempt to examine how well college graduates are prepared to meet the demands of the modern work place (Poling and Ikenberry, 1997). The final results were discussed in the publication, *Spanning the Chasm: Corporate and Academic Cooperation to Improve Work-Force Preparation* (Poling and Ikenberry, 1997). The publication provided suggestions, challenges, and support to build stronger relationships between industry and higher education.

The task force evaluated the education and training needs of corporations, from entry-level through senior leadership positions, but focused its efforts on the education and training needs of new postsecondary hires. Intensive interviews were conducted with three different groups; 1) Ten corporations with highly regarded education and training programs, including firms specializing in manufacturing, professional services, telecommunications, transportation, publications and retail sales, electronics, and hospitality; 2) Twelve higher education institutions that represent the diversity of U.S. higher education, which included public and private, two- and four-year institutions, ranging from small liberal arts colleges to large research institutions; and 3) Five additional corporations that agreed to allow recent graduates to be interviewed (Poling and Ikenberry, 1997).

It was stated in the report that no matter whom the task force spoke to, whether business leader, academic, or employee, the common belief was that the students traditional

campus experience was in need for improvement. The task force made this point clear in stating,

> "Today a chasm separates the academic and corporate worlds. Corporate leaders are convinced that university employees – including administrators and faculty members – do not understand the requirements of the private sector and the need for students to be better prepared for the demands of a changing global economy. Academic leaders are equally sure that corporations have little respect for the campus and that U.S. universities are in fact world class" (Poling and Ikenberry, 1997).

Poling and Ikenberry (1997) reinforce Bradshaw's (1989) findings that both business leaders and academic professionals have preconceived notions about one another and often fail to see the common thread that bond their relationship, the student. Leaders in the business world complained that academia is unwilling to change their ways in any practical time frame, have narrow views of disciplines, fail to consider the true needs of existing careers, expect the support of industry without accountability, and are grossly inefficient in their operations (Poling and Ikenberry, 1997). Conversely, academicians complained that business leaders propose major changes in unrealistic time frames, provide vague descriptions of the skills and knowledge they seek in new employees, send inconsistent messages from different parts of the organization, fail to understand the difference between education and training, and focus too much effort on producing a profit (Poling and Ikenberry, 1997).

The *Spanning the Chasm* report also attempts to interpret the educational expectations of companies that recruit college graduates. Larger corporations are willing and able to train recent graduates with internal programs that provide specific skills for the future job task of the employees, and therefore are more interested in life-long skills and knowledge of new employees (Poling and Ikenberry, 1997). Meanwhile, smaller and medium sized firms unable to afford internal training rely heavily on colleges and universities to provide most of the needed education and skills before graduation (Poling and Ikenberry, 1997). Educators find it difficult to meet the expectations of industry with the variety of businesses that recruit their students. Presidents, faculty, and staff from two-year degree programs were more attuned to business needs than faculty and administration from four-year or liberal arts degree programs because smaller schools have students that are recruited by businesses with very similar expectations and size (Poling and Ikenberry, 1997).

The task force also found differences in the perceptions of faculty about the role of universities and colleges. Virtually every member of the academic community acknowledged that students must be prepared to earn a living, and continued dialog with the business community would be useful to understand both the needs of the private sector and the goals of higher education (Poling and Ikenberry, 1997). But regardless of the sympathetic view of involving the business community, many faculty and administrators believe that curriculum change is still the primary responsibility of the faculty, not industry.

The researchers concluded by using five points for industry and higher education to consider:

1. The primary goal of higher education is to prepare students for employment.
2. Corporate leaders do not view themselves as curriculum experts and therefore faculty have no need to worry about including business members in curriculum evaluation discussions. However, employers' viewpoints are invaluable and should not be assumed useless by academia.
3. The creative faculty members who are convinced of the need to incorporate real-world educational experiences into their courses are the true instruments of change.
4. Representatives from business and higher education need to meet to identify the gaps that exist between the needs of the corporations and the education provided by colleges and universities.
5. Improving work-force preparation will be an ongoing effort by both business and higher education, as they should be able to refine their goals and develop strategies to meet the education and employment needs of today's continually changing world.

(Poling and Ikenberry, 1997)

The task force also suggested steps for industry and higher education to take that would hopefully motivate individuals from either side to take action and attempt to close the chasm. The recommended steps include ideas such as explicitly defining the skills and knowledge desired in new employees (and analyze the learning experiences that facilitate those characteristics) and establishing more developmental work opportunities for students during their undergraduate education (Poling and Ikenberry, 1997). The remaining steps were developed for industry and higher education to begin forming a stronger, more supportive relationship with one another. Involved individuals were reminded that a

relationship between industry and higher education is not a temporary situation, rather the relationship should last infinitely as programs and corporations experience changes.

Research in Engineering

Industrial advisory committees

Strong relationships between industry and higher education are easily found in engineering disciplines. The main accreditation program for engineering is the Accreditation Board for Engineering and Technology (ABET), a non-governmental peer review process which verifies that an engineering program has met criteria to ensure the quality of educational experiences (College of Technology, Engineering and Management, 2003).

One requirement of ABET accredited universities and colleges is to have an industrial advisory committee composed of industrial representatives (Bandyopadhyay, 2001). Industrial advisory boards can facilitate stronger relationships between companies and the colleges they recruit from, but if used incorrectly can exhaust or place a strain on the relationship (Bandyopadhyay, 2001). Incentives of an industrial advisory committee from a company's viewpoint include the opportunity to apprise the institution of changing skills sought for in new hires, exercise a civic and educational role within the community, and forge collaborations on projects that can benefit the company's product line or service (Rooney and Puerzer, 2002). Incentives for engineering programs include increased job possibilities for full-time employment and internships for students, enhancement of the university's stature in the community, and the steering of corporate contributions toward a program's infrastructure development (Rooney and Puerzer, 2002).

When used properly, industrial advisory committees help universities and colleges assure that technical aspects of curriculum are accurate and current, which directly contributes to the growth and development of engineering technology programs (Bandyopadhyay, 2001). Maintaining a successful industrial advisory committee can be difficult. Individuals in both academia and industry often use the excuse that they are too busy and are unable to arrange meeting times. An industrial advisory committee often is the only bridge between academia and the professional arena. And if broken, hard feelings and grudges make reconnection extremely difficult.

Many postsecondary institutions only have superficial industrial advisory committees that do not provide benefit since they are seldom, if ever, used (Bandyopadhyay, 2001). While an advisory committee exists on paper, often times they hardly meet with school officials and even when they do meet, their advice and comments are either not relevant to the development of the program or ignored by the faculty due to poor communication (Bandyopadhyay, 2001). Industrial advisory committees must discuss ways to improve educational programs both short-term and long-term to ensure a lasting working relationship between industry and higher education. It is also important for faculty and staff of universities and colleges to let company representatives know they are important to the success of the program and their input is valuable (Wu and Hunter, 1995).

Industry and higher education relationships

Tener (1996) explained seven important elements used to successfully form a relationship between industry and the university.

1. Faculty and administrators that plan, approve, and teach courses need freedom and authority to adjust curriculum as needed to respond to industry's requirements.

2. An effective industry advisory committee needs to be formed and held to some accountability in the outcomes of the program. All committee members should have sufficient experience and interest in different aspects of the discipline.
3. Curriculum needs to be periodically reviewed and updated with the help of the industry advisory committee to ensure that the educational content is responsive to the industry.
4. All students should be required to partake in at least one internship or co-op (cooperative) program before graduation.
5. When establishing faculty positions and hiring professors, universities and colleges should seek individuals with significant experience in the industry and place less emphasis on the tenure and promotion systems of most schools.
6. Use numerous success indicators to evaluate the outcomes of your program including; rate of hire of graduates, number of firms recruiting and their feedback, feedback from graduates and their employers, advancement of graduates in industry, level of executive talent attracted to industry advisory committee, etc.

(Tener, 1996)

Problems with industry partnerships

While the need to involve more industry members in decisions made in higher education is well documented, creating industrial advisory committees, or any other type of industry involvement with higher education, is not as simple at it may sound. The following two studies shed light on potential problems.

First, does industry understand the goals of higher education? Faculty and administrators often ask if industry members are capable of understanding what universities

and colleges are trying to provide to their students. The National Science Foundation (NSF) Engineering Education Coalitions Program supported a study of 15 different coalition schools to better understand input and feedback from various stakeholders, including industry (McMartin and McGourty, 1999). The researchers found some of the industry's involvement was limited due to the lack of trust by faculty members (McMartin and McGourty, 1999). Many faculty members feared that employers would focus on vocational or employability needs with no emphasis on theory or principles. Instead, when industry members were allowed to contribute, the employer representatives appreciated the need to balance theory and practice and the faculty actually reported that the industry's participation was useful to the assessment process (McMartin and McGourty, 1999). With that said, managers in business and industry often have difficulty stating what kind of education is needed. Industry professionals know a great deal about the problem they are trying to solve and are able to describe it in non-academic terms, but struggle seeing the possible educational connection (M. van Raaij and Weimer, 2003). Industrial advisory committees should have a balanced number of individuals from industry and higher education to provide checks and balances when adjusting curriculum.

A second study brings to light a somewhat surprising argument about possible negative long-term effects of industry involvement in higher education (Chatziioanou and Sullivan, 2002). Their concerns stem from the lack of government funding and a new reliance on industry funding, which has caused public universities to adjust their curricula to meet industry's objectives. Postsecondary institutions that have worked closely with industry for long periods of time (about 10 years) should be aware of their original educational objectives and ensure that some form of checks and balances between industry and higher

education is maintained (Chatziioanou and Sullivan, 2002). These researchers argue that although the larger mission of engineering education is indeed to create engineers, the quality of the overall educational experience as well as other life skills developed on the way are equally important (Chatziioanou and Sullivan, 2002).

Research in Agriculture/Horticulture

Respecting industry input

Although many examples of cooperative relationships between industry and higher education can be found in engineering programs, equally good studies can be found in horticulture or agriculture related fields. Researchers from the Pennsylvania State University surveyed industry members to help decide specific topics of importance for a new landscape maintenance class (Craddock et al., 2003). Companies surveyed had prior contacts with the Landscape Contracting program at Penn State, either through participation in industry events or through recruiting. Data from this study helped faculty choose what specific topics would be covered in the new course and the amount of time spent on each topic. The result was a new landscape construction class specifically designed for landscape management students.

In a study conducted in Illinois, researchers compared the opinions of postsecondary horticulture teachers and business professional regarding peripheral supporting courses taught in the field of ornamental horticulture (Iacomini and Reneau, 1988). While the researchers reported no courses were viewed as "not needed" by the postsecondary horticulture teachers or business professionals, only work experience/internship was considered "essential" for all students enrolled in a horticulture program (Iacomini and Reneau, 1988).

Baker and McLaughlin (1996) surveyed a sample (270 members) of the California Association of Nurserymen (862 members) to determine the essential knowledge areas for students entering the nursery industry. The study indicated that industry believes students should to be taught skills and abilities that will be meaningful to their future employment goals (Baker and McLaughlin, 1996). Due to the immediate employability of students, the researchers felt industry should be included in determining postsecondary curriculum (Baker and McLaughlin, 1996). But, the researchers cautioned that it is essential for postsecondary institutions to consider the regional influences of industry, especially when dealing with a state as diverse as California. (Baker and McLaughlin, 1996).

Other relationships with industry

To determine employer satisfaction with recent graduates, researchers from Oregon State University surveyed agri-business employers who had hired Oregon State University College of Agricultural Sciences (OSU CAS) graduates. Results from this study indicated employers were generally satisfied with OSU CAS graduates, but respondents also indicated these same graduates were deficient in writing skills (Cole and Thompson, 2002).

The Department of Horticulture at Auburn University witnessed a dramatic increase in the number of undergraduate students (56 to 240) between 1985 and 2001 (Sibley et al., 2002). While numerous factors were suggested for this increase, one activity might be most responsible for the exponential growth of students. Horticulture faculty at Auburn routinely invite business professionals to be classroom speakers, enabling students to learn about real-life situations, issues, failures, and successes from industry's standpoint (Sibley et al., 2002). Allowing guest speakers to discuss topics throughout the semester is one way to help build a long-term relationship between industry and higher education.

At the 28th Annual National Agriculture Education Research Conference in 2001, Donna Graham from the University of Arkansas posed the question, "Are We Preparing the Society Ready Graduate?" (Graham, 2001). Graham saw the need to form partnerships with business and industry to achieve common goals for the future workforce. The study was designed to provide benchmark data on skills and abilities important to employers so that reform measures could be taken. The possible reform measures would then be used to better prepare a diverse student population for the higher order thinking and reasoning skills required in an increasingly knowledge-based, service driven economy (Graham, 2001). The idea of preparing society ready graduates is a common phrase heard in many colleges across the country and rightly so because for more than a decade, employers have expressed concern that graduates are not properly educated to meet the challenges of a high-performance workplace (Graham, 2001).

Headed in the right direction?

Between the mid 1970's and the mid 1980's, numerous reports and essays were written that were critical of higher education and prompted universities to begin looking at curriculum revitalization (Erpelding, 1988). One project that grew out of this concern was Curricular Innovation for 2005 – the North Central Curricular Committee Project, which began in March of 1985. After meeting with consultants and faculty to discuss how to tackle this challenge, the committee made the decision to survey faculty, students, alumni, employment specialists, and administrators (Erpelding, 1988). One of the most important aspects of the project was a curriculum assessment designed to determine curricular needs of students, redesign the curricula, and implement the improvements. The interesting point is that to accomplish these goals, ten task forces, each with four to six faculty members and one

or more students were asked to prepare initial recommendations (Erpelding, 1988). Not once was it mentioned to incorporate or use industry to help in the development of this study.

More colleges are looking at industry as a valuable source of information and resources, even when evaluating curriculum. The College of Agriculture and Natural Resources at Cook College, Rutgers University underwent an 18-month review and revitalization of their curricula (Merritt and Hamm, 1994). During the initial information gathering phase of the review, alumni and employers were asked numerous questions about undergraduate education and satisfaction of students coming from Cook College. In addition, employers were asked if students should be more generally or specifically educated and if so, how and why. And finally, employers were asked what changes they anticipate in the future of their industry that would specifically affect the educational background of employees. In the end, employers recommended a practical experience component and supported a common core of knowledge covering numerous fields from environmental concerns to consumer psychology (Merritt and Hamm, 1994). Cook College recognized the need to revamp their educational programs and looked toward industry as an important and valuable source of opinions.

As other postsecondary institutions decide to reevaluate their curriculum, the majority of literature just discussed supports the involvement of industry as a respected source of pertinent information. Yet, building a successful relationship between industry and higher education can be difficult. Individuals from both sides need to stay dedicated to the long-term goals because no one process can guarantee success.

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CHAPTER 3. ASSESSING THE PREPAREDNESS OF POSTSECONDARY GRADUATES ENTERING THE LANDSCAPE CONTRACTING INDUSTRY

A paper submitted to HortTechnology

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Summary

Industry input can assist postsecondary institutions as they strive to provide relevant knowledge and skill-building exercises for the professional development of their students. Using a mail questionnaire, we invited landscape contracting decision-makers to comment on the efficacy of landscape contracting curricula at colleges and universities. The population of Associated Landscape Contractors of America 2003 online member list (2049 companies) was organized into four strata based on company size. A stratified random sample of 400 companies was selected. We received 137 completed questionnaires (35% response rate). Most of the population was either satisfied or extremely satisfied (52%) with college graduates recently hired; only 8.1% of the population was dissatisfied or extremely dissatisfied. When respondents were asked to consider four knowledge categories, a majority (53%) said recent graduates were deficient in business knowledge, followed by construction (25.1%), horticultural (9.6%), and design (5.1%) knowledge. When respondents were asked to rate the importance of topics that could be taught in undergraduate landscape contracting

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programs, business topics (personnel management, estimating and bidding, and clientele management) were identified as their top three choices. The population also named three business-related skills (client relationships, time management, and managing employees) among the five most important skills for landscape contracting professionals. Despite the stated importance of business knowledge and training, 68.3% of the population said when hiring for an entry-level landscape contracting position, they prefer candidates with strong horticultural skills over those with strong business skills. These results suggest landscape contracting firms would welcome a postsecondary-trained work force with improved business skills; however, this business training should not come at the expense of horticultural course work and experience.

Introduction

Mergers, acquisitions, tight budgets, high fuel prices, and other escalating costs have forced U.S. industries to concentrate on increasing productivity while minimizing waste. During these unsettled economic times, businesses in the U.S. want some assurance that college and university graduates are meeting industry workforce needs and requirements (Oblinger and Verville, 1998). Given industry's high expectations, postsecondary institutions should periodically reevaluate their curricula and adjust for future educational needs (Andelt et al., 1997). A needs assessment survey of industry is one technique that may be used to evaluate the success of postsecondary educational programs.

Reviere et al. (1996) defined "needs assessment" as a systematic and ongoing process of providing useable information about the needs of a target population to those who can and will use it to make judgments about policy or programs. The target population (stakeholders)

involved in needs assessment can vary from students and alumni to faculty and staff (Ahlgren and Palladino, 2000; Scales et al., 1998). An increasingly important stakeholder group is employers, especially when the mission of the postsecondary unit is to prepare workers for immediate employment in technical fields (Banta et al., 1996).

Historically, the discipline of engineering has recognized the importance of needs assessment. The Accreditation Board for Engineering and Technology (ABET) requires assessments and industrial advisory boards for all programs seeking accreditation (Van Dyke and Williams, 1996). Standards set by ABET have forced engineering programs to incorporate numerous techniques of assessment including capstone design courses, employer surveys, exit interviews, alumni surveys, standardized testing, and industrial advisory boards (McMartin and McGourty, 1999; Puerzer and Rooney, 2002; Scales et al., 1998).

In an engineering-assessment study, faculty did not trust the opinions of industry members and prematurely assumed comments by employers would be focused on vocational or employability needs (McMartin and McGourty, 1999). However, when industry involvement was properly structured, employers countered resistant faculty by adding a great deal of value to numerous assessment activities (McMartin and McGourty, 1999).

Although not required by accreditation boards like ABET, postsecondary agricultural programs have developed and implemented needs assessments involving industry (Andelt et al., 1997; Baker and McLaughlin, 1996; Iacomini and Reneau, 1988; Radhakrishna and Bruening, 1994; Scoggins et al., 2004). Researchers in one study included employers as one of their most important stakeholders to assess accurately the success or failure of their graduates (Cole and Thompson, 2002). Industry members with ties to Penn State University's landscape contracting program were surveyed in another study to help decide

important topics for a new landscape maintenance class being developed (Craddock et al., 2003).

We conducted a survey of ALCA members to address two objectives. First, we sought to assess the perceptions of landscape contracting decision-makers regarding the overall efficacy of how landscape contracting programs prepare students for careers in the green industry. Secondly, we wished to characterize opinions of the same industry members regarding business training and its relative importance within the broader curriculum of landscape contracting.

Material and Methods

We obtained addresses and contact information from our population of 2049 companies from the 2003 online list of Associated Landscape Contractors of America (ALCA) members. Face-to-face interviews with a sample of potential employers were conducted during the 2004 ALCA Student Career Days at Columbus State Community College in Columbus, Ohio, to help develop the final survey. Ten of 11 selected (ad-hoc allocation) companies were interviewed over the 3-d period of 25 to 27 Mar. 2004. All 11 companies subsequently were removed from the sample frame.

The remaining population of 2038 companies was placed in one of four strata based on annual revenue (stratum 1 = < $250,000; stratum 2 = $250,000 to $750,000; stratum 3 = $750,000 to $2 million; and stratum 4 = > $2 million). Stratum sizes were within 7.2% of one another ($N_1 = 589$, $N_2 = 442$, $N_3 = 503$, and $N_4 = 504$). Homogeneous variances and survey costs among strata were assumed, and thus proportional allocation was used to select the sample size (Lohr, 1999). Variance was assumed to be $S^2 = p (1 - p)$ with the proportion,

p, equal to 0.5. We assumed a worst-case scenario of population members equally splitting their opinions between two response options (p = 0.5). We also assumed a 60% response rate and a 6.4% margin of error. A sample size of 400 ($n_1 = 115$; $n_2 = 87$; $n_3 = 99$; and $n_4 = 99$) was determined after reviewing combinations of acceptable margins of error, response rates, and budgetary constraints (Lohr, 1999).

The Tailored Design Method process was used to develop and implement the survey (Dillman, 2000). This process was designed to maximize the quality and quantity of responses by ensuring respondents that the rewards of participating will outweigh the costs they expect to incur (Dillman, 2000). The list of contacts and addresses was confirmed via up to five personal telephone calls to each company. We used a script to ensure consistency in conversations. Although we confirmed addresses and contacts for only 330 of the 400 (82.5%) companies, a survey was still sent to the entire sample of 400.

The survey instrument was a 12-page booklet made from three letter-sized, double-sided sheets of paper in landscape format. The front page contained photographs, the title of the survey, and Iowa State University affiliation. Part one of the survey instrument was 12 multiple-choice and Likert (1932) scale-type questions about the importance of different aspects of landscape contracting programs. Part two was 11 personal and company demographic, multiple-choice questions. The final two pages contained three open-ended questions for additional advice or comments. Postage was unnecessary due to a business mail reply.

Four first-class mailings were sent to maximize response rate. Four hundred advance-notice letters were sent on 28 June 2004. A survey and cover letter were sent 8-d later. A reminder postcard was sent on 12 July 2004. Between 28 June and 16 July 2004

advance-notice letters, surveys, cover letters, and postcards were re-sent if returned with a new address supplied by the U.S. Postal Service. A second cover letter was developed to encourage participation by nonrespondents. A second survey and the new cover letter were mailed on 29 July 2004 to all nonrespondents. Completed surveys were accepted through 7 Sept. 2004. Returned surveys were coded, entered into a Microsoft® Office Excel (2003; Redmond, WA) file, and confirmed by a third party.

Data were analyzed using SAS (release 9.1; SAS Institute, Cary, NC). The SURVEYMEANS procedure was used to calculate mean percentages and ratings with standard errors, 95% confidence levels, adjusted weights, and all chi-square tests ($P \leq 0.05$). Weights were calculated by dividing each stratum population by the respective number of respondents in that stratum. Standard errors are reported with two significant digits and corresponding statistics are rounded to the same decimal place.

Results and Discussion

Eight companies were considered ineligible due to addresses outside the U.S. or unavailable addresses. Seven more companies were unlocatable. Three returned surveys were considered incomplete. The response rate (35%) was derived from 137 complete returned surveys.

Demographic responses

The majority of the population was male (86.9%) between the ages of 30 and 59 (84.7%). Responses were received from all six regions (Fig. 1). The largest category of the population was sole owners (39.4%), followed by presidents or vice-presidents (29.9%). An equal number of managers and company partners responded (12.4% each), with the

remaining population (5.8%) considered supervisors, full-time sales persons, full-time recruiting staff, or holders of other miscellaneous positions. Fifty-four percent of the population had been in their current position for > 10 years, whereas 29.9% had held their position for < five years.

The highest level of education completed by the majority of the population was a bachelor's degree (58%), followed by a high school and associate degree (16% each), and a master's degree (8%). The remaining population (2%) checked "something else" for their highest level of education.

Multiple-choice and Likert-scale responses

Respondents were asked what knowledge was lacking or deficient among postsecondary graduates entering the landscape contracting work force. Given the choices of horticultural, construction, design, and business knowledge, most (53.1%) of the population said recent graduates were deficient in business knowledge (Table 1). Similar to one of the top ten undergraduate improvements reported by Cole and Thompson (2002), our population suggest industry would welcome graduates with a better understanding of business topics and/or skills before entering the workforce. The smaller percentage of our population who identified horticultural (9.6%) or design (5.1%) knowledge as lacking or deficient suggests landscape contracting graduates are sufficiently trained in those categories. Postsecondary institutions looking to bridge the gap between theory and practice (Lynton, 1984) by integrating the needs and expectation of industry would seek to understand why a larger percentage of respondents chose construction (25.1%) or business (53.1%) knowledge as lacking or deficient.

Significant differences were found (P = 0.019) when responses to the question about lacking or deficient knowledge among postsecondary graduates were grouped by age of respondents (< or ≥ age 40). Horticultural knowledge was considered lacking or deficient by 16% of the population ≥ age 40 but by 0% of the population < age 40. Construction knowledge was considered lacking or deficient by 17.3% of the population ≥ age 40 and 38.1% of the population < age 40. The results suggest younger respondents (< age 40) believe horticultural knowledge gained during a postsecondary education is sufficient for success in the landscape contracting industry, however, over one-third believe construction and business knowledge is deficient among graduates.

The population expressed a mean score of 3.944 (SE = 0.063) on a five-point Likert scale (1 = no emphasis and 5 = strong emphasis) when asked what emphasis should be placed on business training in an undergraduate landscape contracting program. A majority (73.0%) of the population felt business training should receive above-moderate (4 out of 5) or strong emphasis (5 out of 5). A small portion of the population (1.5%) said there should be no (1 out of 5) or below-moderate emphasis (2 out of 5). The remaining 25.5% of the population said business training should receive moderate emphasis (3 out of 5) in undergraduate landscape contracting programs.

Using a five-point Likert scale (1 = not important and 5 = very important) we also asked respondents to rate each of 32 topics that could be taught in a landscape contracting undergraduate program. The business-related topics of personnel management, estimating and bidding, and clientele management were rated most important (Table 2). The horticultural science topics plant propagation, plant physiology, and plant biology received the lowest, third, and fourth lowest ratings, respectively (Table 2).

Respondents used the same Likert scale (1 = not important and 5 = very important) to rate each of 43 skills used by individuals in the landscape contracting industry. Three of the top five most highly-rated skills were the business-related skills of client relationships, time management, and managing employees (Table 3). Good work ethic (4.840, SE = 0.032) and proper attitude/personality (4.783, SE = 0.039) received the highest ratings (Table 3). Lowest ranked skills included a construction skill (pond installation), a business skill (advertising techniques), and a horticultural skill (ability to ball and burlap trees) (Table 3).

These ratings begin to define industry's opinions about what topics and skills should be emphasized by postsecondary institutions, however, it is important to remember the population rated only two topics, business law (2.95) and plant propagation (2.74), below average in importance. Considering skills, respondents rated only the ability to ball and burlap trees (2.84) below average in importance. Thus, the population seems to suggest almost every topic and skill mentioned in our study is of at least average importance, with many rated above average. It would not be wise to use these ratings to make decisions about what to cover and what not to cover in landscape contracting programs, but rather what topics and skills could be given more emphasis and what topics and skills are possibly over-emphasized in landscape contracting curricula across the U.S.

Respondents also were asked to choose between two hypothetical candidates with equally good attitude, ambition, and work ethic for an entry level landscape contracting position. The only difference between the candidates was in their skill strengths. A majority (68.3%) of the population said when given a choice, they preferred hiring entry-level employees with strong horticultural skills and weak business skills rather than employees with strong business skills and weak horticultural skills.

This question, specifically placed at the end of the survey (before demographic questions), helped us avoid an incorrect interpretation of the data; the green industry demands that landscape contracting programs replace horticultural and design training with business training. Instead, industry seems to be saying they would like students to receive more business training, but not necessarily at the expense of courses currently being offered (Higley, 2004a). Integrating business topics and skills into current landscape contracting programs without weakening other important content then becomes the challenge for postsecondary institutions.

Significant differences were found ($P = 0.002$) when responses to this hypothetical question were grouped according to gross annual revenue of the population. A majority (55.9%) of the population choosing strong business skills over strong horticultural skills came from firms reporting an annual revenue $\geq$ \$2 million while only 22.8% were from companies with annual revenue < \$2 million. The landscape industry has experienced an average 20% annual growth between 1997 and 2004 (Associated Landscape Contractors of America, 2004). Growth of this magnitude for large companies could require the addition of employees, crews, or branches. Furthermore, large companies experiencing sustained and rapid growth might have a substantial need for employees with business skills to fill supervisory and managerial positions; assuming companies with $\geq$ \$2 million in annual revenue are not hiring business staff with the intention of providing necessary horticultural training. For smaller companies, however, 20% growth might equate to longer hours, additional part-time employees, or only a few additional full-time employees. Smaller companies with more modest increases in growth may be better served by employees with strong horticultural skills instead of strong business skills.

Significant differences also were found (P = 0.036) when responses to our hypothetical question were analyzed by age of the population. An employee with strong horticultural skills was preferred by only 57.5% of the population < age 40, compared to 75% of the population ≥ age 40. The landscape contracting industry has undergone constant financial and economic change during the past 10 years, and companies have adjusted accordingly to stay in business (Higley, 2004b). And as landscape managers watched their companies grow and prosper, they were confident in the fact that having employees with strong horticultural skills ensured more customers, and as long as the company was busy, profits were being made (D. Spunaugle, personal communication). These beliefs no longer guarantee success in the highly competitive landscape contracting market of today (Higley, 2004b). Respondents under the age of 40 entered a different landscape industry than respondents ≥ age 40, and a sizeable percentage (42.5%) of younger respondents seem to be indicating business skills are essential for success.

Respondents were asked if they actively recruit employees from colleges and universities. Forty-four percent of the population said they recruit from postsecondary institutions offering four-year bachelor's degrees and postsecondary institutions offering two-year associate degrees, however, one-third (33%) of the population said their company does not recruit at all from postsecondary institutions. Significant differences were found when responses regarding recruiting practices were grouped by four company size classifications (P = 0.0168). Relatively large percentages of the population from smaller companies, < $250,000 (40.6%) and $250,000 to $750,000 (48.2%) in gross annual revenue, said they do not recruit, whereas a smaller percentage of the population from larger

companies, $750,000 to $2 million (31%) and > $2 million (11.4%) in gross annual revenue, said they do not recruit from postsecondary institutions.

Why the difference in recruiting between companies < or >$750,000 in annual revenue? Kratcoski (2005) believes companies need more postsecondary graduates to fill supervisory and management positions as annual revenue increases. In addition, overhead fixed expenses decrease as annual revenue increases (Baye, 2003). Thus, larger companies can afford management recruiting services or full-time recruiters to search for future employees (Kratcoski, 2005). The time and money needed to recruit from colleges and universities might inhibit smaller companies from competing for high quality postsecondary graduates.

Respondents rated their satisfaction with postsecondary graduates they have either worked with or hired during the past five years. Using a five-point Likert scale (1 = extremely dissatisfied; 2 = dissatisfied; 3 = neutral; 4 = satisfied; 5 = extremely satisfied), the population gave graduates an average rating of 3.534 (SE = 0.075). More than one-half (52%) of the population said they were either satisfied or extremely satisfied, 40% were neutral, and only 8% were either dissatisfied or extremely dissatisfied with postsecondary graduates.

The apparent satisfaction of the population with recent graduates could be related to recruiting practices. If employers feel they are not gaining value or are dissatisfied with recruited students, skepticism or disappointment can develop (Lynton, 1984). Forty percent of the population said they were neutral; neither satisfied nor dissatisfied, with postsecondary graduates. Neutral population members might change and develop a satisfied or dissatisfied opinion based on future experiences. Colleges and universities can increase satisfaction of

employers by providing quality graduates and welcoming recruiters to campus (Poling and Ikenberry, 1997).

When asked if most colleges and universities that provide landscape contracting programs are in touch with the needs and expectations of industry, the largest percentage (39.1%) of the population said no. Significant differences were found (P = 0.0188) when the population was grouped by geographic region. Only 25% of the population in five of six regions believed most universities and colleges are in touch with industry needs and expectations. But in the South region, 51.8% of the population said colleges and universities are in touch with industry needs and expectations. A higher percentage of positive perceptions from this region might be attributed to the fact that the first postsecondary landscape contracting program (Mississippi State University) is from this region. In addition, nursery and landscape professionals in the southeastern U.S. have a long history of supporting education and research via state and regional green industry organizations (Southern Nursery Association, for example).

In a national study of employers, faculty, staff, students, and alumni, it was found employers felt postsecondary faculty and administrators did not understand the needs of the private sector and the demands of an economy under constant change (Poling and Ikenberry, 1997). Meanwhile, postsecondary faculty, staff, and administrators felt employers do not respect the high-quality education they are providing (Poling and Ikenberry, 1997). The study also indicated industry leaders do not view themselves as experts in understanding curricula, yet their insight and experience are valuable and should be viewed as such (Poling and Ikenberry, 1997). In our survey, practically all of the population (96.7%) agreed industry professionals should be invited to take a more active role in shaping the menu of coursework

offered in landscape contracting programs. Creating a collaborative relationship between faculty and industry can ultimately result in gains for the one common investment, the students (Marsden, 1989).

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Table 1. Responses of ALCA industry members when asked: "Overall, what knowledge is lacking or deficient among college/university graduates entering the landscape contracting work force?"

	Annual revenue[z] (thousands)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Knowledge options	Percentage of responses				
Horticulture	9.6	0.0	12.5	12.1	15.6
	(2.5)[y]	(0.0)	(6.7)	(5.5)	(6.3)
Construction	25.1	32.1	25.0	27.3	15.6
	(4.0)	(8.7)	(8.7)	(7.5)	(6.3)
Design	5.1	0.0	4.1	15.2	3.1
	(1.8)	(0.0)	(4.0)	(6.1)	(3.0)
Business	53.1	57.1	54.2	39.4	59.4
	(4.6)	(9.3)	(10.4)	(8.3)	(8.5)
Adequate[x]	7.1	10.7	4.2	6.1	6.3
	(22.4)	(5.8)	(4.0)	(4.0)	(4.2)
	(n = 117)[w]	(n_1 = 28)	(n_2 = 24)	(n_3 = 33)	(n_4 = 32)

[z] Gross annual revenue

[y] Standard error

[x] Graduates have adequate knowledge with no deficiencies in the four choices.

[w] Total number of respondents per category.

Table 2. Responses of Associated Landscape Contractors of America industry members when asked to rate[z] topics from a list that could be taught in any landscape contracting undergraduate program. Response options are ranked in descending order using the overall mean. Ten highest and five lowest rated topics are shown.

	Annual revenue[y] (thousands of U.S. dollars)									
	Overall		< 250		250 - 750		750 - 2,000		> 2,000	
Topic options[x]	Mean rating of responses									
Highest rated										
Management (personnel)	4.54	(0.06)[w]	4.53	(0.12)	4.50	(0.12)	4.46	(0.09)	4.66	(0.11)
Estimating and bidding	4.53	(0.06)	4.48	(0.17)	4.43	(0.12)	4.56	(0.09)	4.63	(0.08)
Management (clientele)	4.46	(0.06)	4.44	(0.13)	4.50	(0.12)	4.38	(0.10)	4.51	(0.13)
General design principles	4.41	(0.06)	4.44	(0.14)	4.33	(0.13)	4.48	(0.10)	4.36	(0.13)
Plant ID (trees/shrubs)	4.39	(0.07)	4.31	(0.15)	4.29	(0.15)	4.56	(0.10)	4.39	(0.13)
Plant ID (perennial/annual)	4.26	(0.07)	4.19	(0.15)	4.04	(0.15)	4.43	(0.11)	4.36	(0.12)
Plant establishment / maintenance	4.19	(0.07)	4.09	(0.16)	4.25	(0.12)	4.21	(0.11)	4.24	(0.13)
Grading and drainage	4.19	(0.07)	4.15	(0.13)	4.07	(0.18)	4.29	(0.11)	4.21	(0.16)
Production management	4.18	(0.07)	4.13	(0.13)	4.21	(0.14)	4.10	(0.12)	4.30	(0.17)
Computer skills	4.08	(0.07)	4.07	(0.14)	3.93	(0.15.)	4.07	(0.10)	4.24	(0.14)

[z] Rating scale: (1) Not Important, (2) Below Average Importance, (3) Average Importance, (4) Above Average Importance, and (5) Very Important.

[y] Gross annual revenue.

[x] Respondents rated 32 total topics.

[w] Standard error.

Table 2. (continued)

Lowest rated					
Multimedia presentations	3.32 (0.08)	3.48 (0.13)	3.39 (0.15)	3.12 (0.13)	3.28 (0.19)
Plant biology	3.31 (0.07)	3.34 (0.15)	3.32 (0.12)	3.17 (0.13)	3.40 (0.15)
Plant physiology	3.31 (0.07)	3.34 (0.16)	3.43 (0.14)	3.21 (0.13)	3.26 (0.17)
Business law	2.95 (0.08)	2.97 (0.20)	3.14 (0.16)	3.05 (0.12)	2.66 (0.16)
Plant propagation	2.74 (0.08)	2.97 (0.17)	2.74 (0.16)	2.48 (0.14)	2.73 (0.19)

Table 3. Responses of Associated Landscape Contractors of America industry members when asked to rate[z] the importance of skills used by individuals in the landscape contracting industry. Response options are ranked in descending order using the overall mean. Ten highest and five lowest rated skills are shown.

	Annual revenue[y] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Skill options[x]	Mean rating of responses				
Highest rated					
Good work ethic	4.84 (0.03)[w]	4.81 (0.07)	4.86 (0.07)	4.81 (0.07)	4.89 (0.05)
Proper attitude / personality	4.78 (0.04)	4.81 (0.07)	4.71 (0.11)	4.76 (0.07)	4.83 (0.06)
Client relationships	4.63 (0.05)	4.56 (0.11)	4.57 (0.11)	4.64 (0.07)	4.74 (0.09)
Time management	4.57 (0.05)	4.48 (0.12)	4.64 (0.09)	4.50 (0.10)	4.65 (0.09)
Managing employees	4.48 (0.06)	4.46 (0.12)	4.32 (0.20)	4.52 (0.09)	4.62 (0.10)
Plant identification	4.46 (0.06)	4.38 (0.12)	4.39 (0.13)	4.67 (0.09)	4.40 (0.13)
Organizational skills	4.39 (0.05)	4.34 (0.10)	4.36 (0.10)	4.33 (0.09)	4.54 (0.09)
Proper planting techniques	4.31 (0.06)	4.33 (0.10)	4.41 (0.14)	4.35 (0.12)	4.15 (0.15)
Production management	4.31 (0.07)	4.19 (0.15)	4.32 (0.14)	4.33 (0.10)	4.38 (0.15)
Internships or work experience	4.30 (0.06)	4.13 (0.13)	4.32 (0.14)	4.36 (0.13)	4.43 (0.11)

[z] Rating scale: (1) Not Important, (2) Below Average Importance, (3) Average Importance, (4) Above Average Importance, and (5) Very Important.

[y] Gross annual revenue.

[x] Respondents rated 43 total skills.

[w] Standard error.

Table 3. (continued)

Lowest rated										
Member of associations	3.47	(0.08)	3.41	(0.17)	3.61	(0.17)	3.38	(0.14)	3.51	(0.16)
Understanding law of business	3.35	(0.08)	3.44	(0.18)	3.46	(0.16)	3.45	(0.11)	3.06	(0.15)
Pond installation	3.28	(0.08)	3.37	(0.17)	3.26	(0.15)	3.44	(0.13)	3.03	(0.15)
Advertising techniques	3.21	(0.07)	3.56	(0.15)	3.46	(0.15)	3.02	(0.13)	2.82	(0.14)
Ability to ball and burlap trees	2.84	(0.08)	2.78	(0.12)	2.89	(0.20)	2.86	(0.13)	2.83	(0.19)

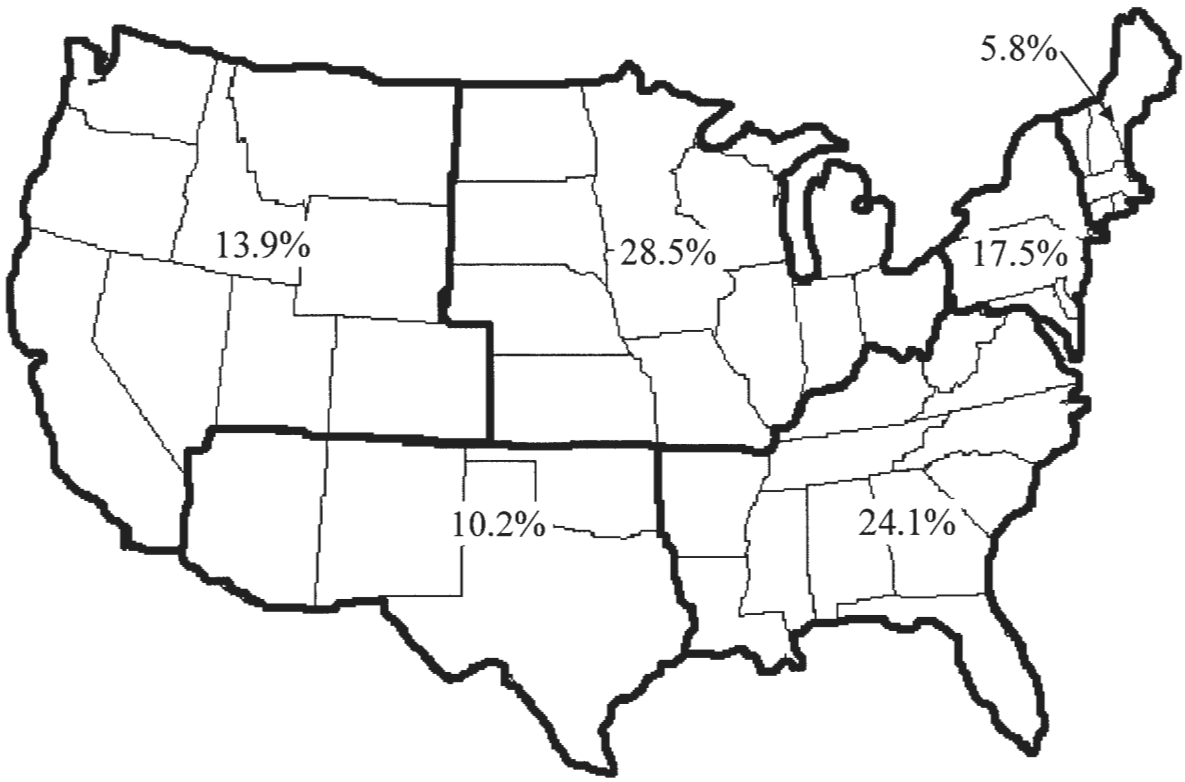


Figure 1. Population percentage of Associated Landscape Contractors of America in each of six possible regions of the United States.

Mid-Atlantic region (17.5%) includes DE, MD, NJ, NY, PA, and DC
New England region (5.8%) includes CT, MA, NH, ME, RI, and VT
Midwest region (28.5%) includes IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI
South region (24.1%) includes AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV
Southwest region (10.2%) includes AZ, NM, OK, and TX
West region (13.9%) includes AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

CHAPTER 4. GENERAL CONCLUSIONS

Each year, postsecondary institutions are challenged by budgetary constraints, pressures to attract sufficient number of high quality students, and the need/obligation to find fulfilling and meaningful employment for graduates. These challenges are magnified when employers in both the public and private sector of industry lose confidence in, or are critical of graduates and their level of training.

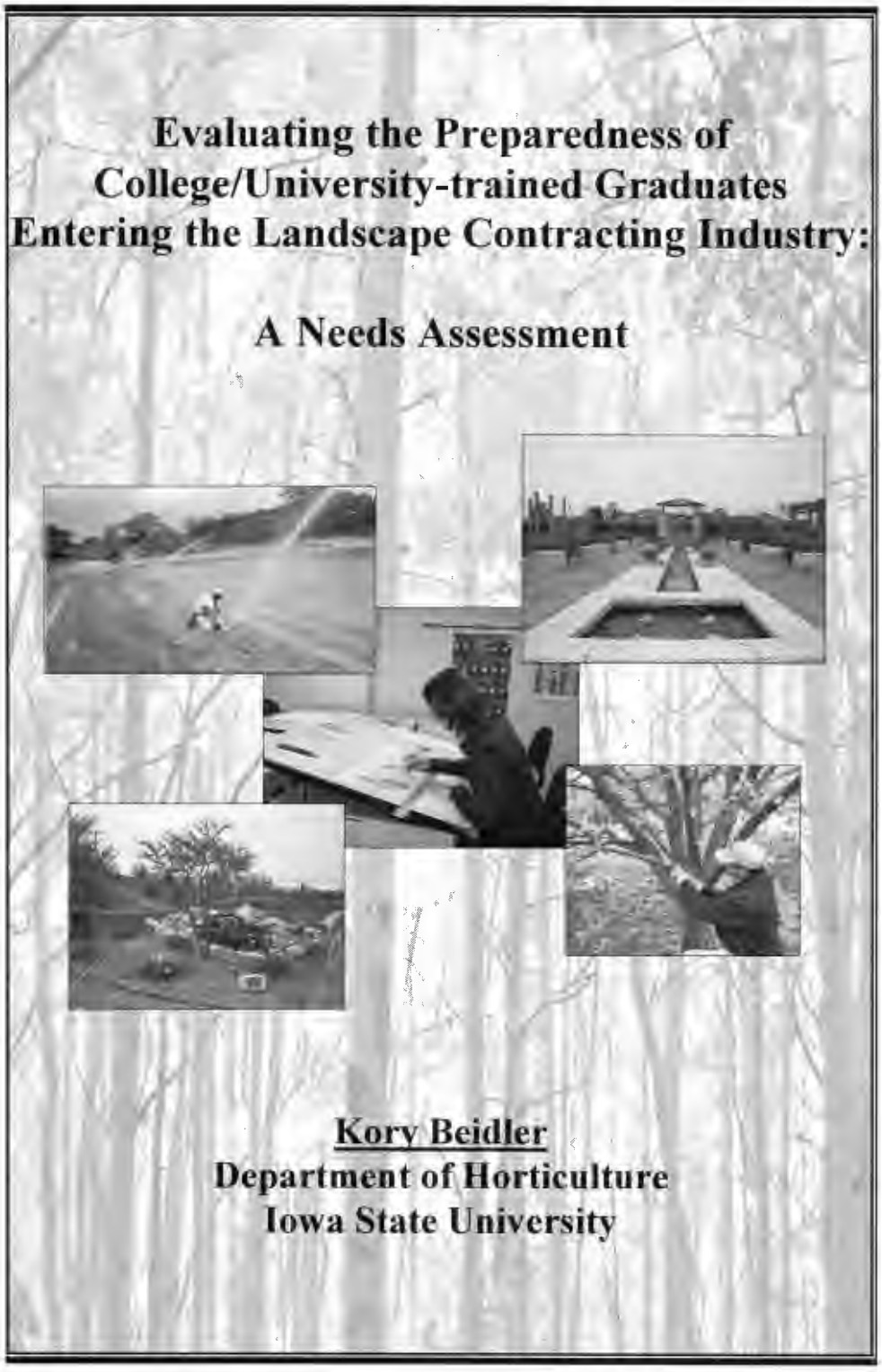
Some landscape contracting professionals have been critical of postsecondary institutions that provide the future leaders of their industry. While some postsecondary educators attempt personal communication at industry functions to gain helpful insight from professional decision-makers, two and four-year degree programs could benefit from solid assessments to help improve landscape contracting programs. Our research study assessed one segment, professional landscape contracting decision-makers, out of many possible stakeholders. Our objective was to assess the perceptions of these individuals regarding the overall efficacy of landscape contracting programs, and more specifically the need for business training and its relative importance. The accumulated data and final conclusions are offered to postsecondary institutions to assist with curriculum decisions and promote stronger relationships with industry.

An important general conclusion of our study was that landscape contracting decision-makers would like students to receive more business training, but not at the expense of horticulture and landscape construction training. Even with industry's suggestion to increase business training, many postsecondary institutions have difficulty adding or

removing courses. One way to incorporate business training without removing current curricula is to integrate business topics and skills into existing coursework.

Our research is a first step toward understanding the opinions of landscape contracting professionals; however there is still much information to be gathered. In our study, we sampled only a portion of a single population of landscape contracting professionals to make inferences about the industry. Future research could follow up with this population to confirm or contradict our findings. When we constructed the population for our study at the end of 2003, there were 2049 companies registered as members of ALCA. Since that time, ALCA memberships have increased, due in large part to ALCA's merger with the Professional Lawn Care Association of America to form a new 4,000 member association called the Professional Landcare Network (PLANET). In the summer of 2005, there is talk of an additional merger of PLANET and the American Nursery and Landscape Association (ANLA). These changes among green industry professional associations will provide future researchers a larger and possibly more coherent population of landscape contracting professionals. Knowing and understanding the opinions and perceptions of landscape contracting decision-makers can help facilitate a stronger relationship between industry and higher education, which could eventually lead to benefits for the one common investment, the students.

APPENDIX A. SURVEY INSTRUMENT



General Instructions

For each question that follows, please circle one answer or enter one response that best represents your opinion or experiences.

If you feel none of the responses listed are appropriate, circle the number next to "Other" and write your answer in the space provided.

Part I: Your Opinions

Q-1 Overall, what knowledge is lacking or deficient among college/university graduates entering the landscape contracting work force? **(Although more than one might apply, please circle only one)**

1 = Basic Horticulture knowledge is not adequate.

2 = Basic Construction knowledge is not adequate.

3 = Basic Design knowledge is not adequate.

4 = Basic Business knowledge is not adequate.

5 = Graduates have adequate knowledge.

Q-2 Do you feel most universities and colleges that provide programs like landscape contracting (also called landscape design, landscape horticulture, etc.) are in touch with the needs and expectations of industry?

1 = Yes, most universities and colleges are in touch with industry's needs.

2 = No, most universities and colleges are not in touch with industry's needs.

3 = Don't know, no opinion.

Q-3 Should green industry professionals be invited to take a more active role in shaping the menu of courses required of landscape contracting undergraduates at colleges and universities?
Example: Voluntarily serving on an Advisory Board that recommends pertinent coursework and then helps assess the effectiveness of that curriculum.

1 = Yes, industry members should be involved in academic decision-making.

2 = No, industry members should not be involved in academic decision-making.

Q-4 In your opinion, what role should colleges and universities play in educating undergraduate students in landscape contracting (or similar) programs?

1 = Help students develop specific skills for specific careers.

2 = Prepare students for careers by blending both practical & theoretical material.

3 = Develop student's critical thinking capacities and problem solving skills with little emphasis on specific skills.

= Other (Please describe: _____)

Q-5 Please rate the importance of the following **topics** that could be taught in any landscape contracting (or similar) undergraduate program.
Rate **topics** according to the 1 through 5 scale below:

	Not Important	Below Average Importance	Average Importance	Above Average Importance	Very Important
Business related topics:					
Accounting	1	2	3	4	5
Business Administration	1	2	3	4	5
Business Law	1	2	3	4	5
Marketing	1	2	3	4	5
Developing a Business Plan	1	2	3	4	5
Finance	1	2	3	4	5
Estimating & Bidding	1	2	3	4	5
Management (Personnel)	1	2	3	4	5
Management (Clientele)	1	2	3	4	5
Production Management	1	2	3	4	5
Horticulture related topics:					
Plant Identification (trees/shrubs)	1	2	3	4	5
Plant Identification (perennial/annual)	1	2	3	4	5
Entomology (Insects)	1	2	3	4	5
Irrigation	1	2	3	4	5
Plant Establishment & Maintenance	1	2	3	4	5
Plant Biology (botany)	1	2	3	4	5
Plant Physiology	1	2	3	4	5
Turfgrass Management	1	2	3	4	5
Introduction to Soils	1	2	3	4	5
Plant Pathology (diseases)	1	2	3	4	5
Arboriculture (tree care)	1	2	3	4	5
Plant Propagation	1	2	3	4	5

Q-5 (Continued from last page)

Design/Construction topics:	Not Important	Below Average Importance	Average Importance	Above Average Importance	Very Important
Designing Residential Landscapes	1	2	3	4	5
Designing Commercial Landscapes	1	2	3	4	5
General Design Principles	1	2	3	4	5
Surveying	1	2	3	4	5
Grading & Drainage	1	2	3	4	5
Other related topics:					
Computer Skills	1	2	3	4	5
Public Speaking	1	2	3	4	5
Business Writing	1	2	3	4	5
Multi Media Presentations	1	2	3	4	5
Spanish	1	2	3	4	5
Other _____	1	2	3	4	5

Q-6 Are there other topics not previously mentioned that should be included in a landscape contracting curriculum for undergraduates? **(Circle one)**

1 = Yes (Please describe below)

Topic(s) _____

2 = No

Q-7 Please rate the importance of the following **skills** used by individuals in the landscape contracting industry.
Rate **skills** according to the 1 through 5 scale below:

Business related skills:	Not Important	Below Average Importance	Average Importance	Above Average Importance	Very Important
Managing Employees	1	2	3	4	5
Client Relationships	1	2	3	4	5
Understanding Budgets	1	2	3	4	5
Understanding Laws of Business	1	2	3	4	5
Accounts Payable/Receivable	1	2	3	4	5
Advertising Techniques	1	2	3	4	5
Marketing Techniques	1	2	3	4	5
Time Management	1	2	3	4	5
Production Management	1	2	3	4	5
Ability to Speak Professionally	1	2	3	4	5
Ability to Write Professionally	1	2	3	4	5
Conflict Management	1	2	3	4	5
Design/Construction related skills:					
Hand Drafting Techniques	1	2	3	4	5
Computer Drafting (AutoCAD)	1	2	3	4	5
Paver Installation	1	2	3	4	5
Small Wall Installation	1	2	3	4	5
Pond Installation	1	2	3	4	5
Ability to Ball and Burlap Trees	1	2	3	4	5
Proper Planting Techniques	1	2	3	4	5
Using a Transit	1	2	3	4	5
Grading Techniques	1	2	3	4	5
Small Equipment Operation (Example: rototiller, blower, etc.)	1	2	3	4	5
Large Equipment Operation (Example: Bobcat, riding mower, etc.)	1	2	3	4	5

Q-7 (Continued from last page)

Horticulture skills:	Not Important	Below Average Importance	Average Importance	Above Average Importance	Very Important
Plant Identification	1	2	3	4	5
Insect Identification	1	2	3	4	5
Disease Identification	1	2	3	4	5
Pruning Techniques	1	2	3	4	5
Fertilization Techniques	1	2	3	4	5
Irrigation Troubleshooting	1	2	3	4	5
Irrigation Repairs	1	2	3	4	5
Proper Watering Techniques	1	2	3	4	5
Soil Test Interpretation	1	2	3	4	5
Understanding Plant Growth	1	2	3	4	5
Pesticide Application/License	1	2	3	4	5
Identifying Abiotic Stresses	1	2	3	4	5

(Abiotic: Nonliving agents, i.e. temperature extremes, construction injury, etc.)

Other related skills/experiences:					
Internships or Work Experience	1	2	3	4	5
Organizational skills	1	2	3	4	5
Use of Email / Internet	1	2	3	4	5
Use of Microsoft Word, Excel	1	2	3	4	5
Bilingual in Spanish	1	2	3	4	5
Member of Associations (ALCA, etc.)	1	2	3	4	5
Proper Attitude / Personality	1	2	3	4	5
Good Work Ethic	1	2	3	4	5

Q-8 Are there other skills not previously mentioned that should be emphasized in a landscape contracting curriculum for undergraduates? **(Circle one)**

1 = Yes (Please describe below)

Topic(s) _____

2 = No

Q-9 In your opinion, what emphasis should be placed on business training in an undergraduate landscape contracting (or similar) program?

No Emphasis	Below Moderate Emphasis	Moderate Emphasis	Above Moderate Emphasis	Strong Emphasis
1	2	3	4	5

Q-10 When you actively recruit employees, what type of schools do you recruit from?

1 = Universities or colleges offering four-year bachelor degrees

2 = Colleges or Technical schools offering two-year associate degrees

3 = Both four-year and two-year degree programs

4 = Do not recruit from colleges or universities

Q-11 Please rate your satisfaction with recent college graduates you have hired or worked with in the past five years.

Extremely Dissatisfied	Dissatisfied	Neutral	Satisfied	Extremely Satisfied
1	2	3	4	5

Q-12 If you were hiring for an entry-level landscape contracting position and could choose between two candidates with equally good attitude, ambition and work ethic, but had different skill strengths, which one would you choose?

1 = Strong horticulture skills, weak business skills.

2 = Strong business skills, weak horticulture skills.

Part II: Company Demographics

Q-13 How many locations or branches does your company operate? **(Circle one)**

1 = 1 location / branch

2 = 2 to 10 locations / branches

3 = More than 10 branch locations / branches

Q-14 What is the best estimate of your entire company's (all branches included) annual gross revenue (total sales before expenses)? **(Circle One)**

1 = Less than $250,000

2 = $250,000 up to $750,000

3 = $750,000 up to $2 million

4 = $2 million or more

Q-15 What is the best estimate of your branch's annual gross revenue? If you only have one branch, this answer will be the same as the previous answer in Q-14.

1 = Less than $250,000

2 = $250,000 up to $750,000

3 = $750,000 up to $2 million

4 = $2 million or more

Q-16 What percentage of your branch's revenue is derived from each of the following types of clients? If none, enter 0. **(Note: Total must equal 100%)**

a. Residential _____%

b. Commercial _____%

c. Municipal _____%

d. Other _____% (please describe: _____)

Total 100 %

Q-17 What percentage of your branch's services is distributed to each of the following categories? If none, enter 0. **(Note: Total must equal 100%)**

a. Landscape Maintenance _____%

b. Plant Installation _____%

c. Hardscape Installation _____% (Example: decks, patios, & walls)

d. Landscape Design _____%

e. Irrigation _____%

f. Arboriculture (tree care) _____%

g. Interiorscape _____%

h. Other _____% (please describe: _____)

Total 100 %

Q-18 What region of the United States is your company located? If you have more than one location use your branch only. **(Circle one)**

1 = Mid-Atlantic (DE, MD, NJ, NY, PA, DC)

2 = New England (CT, MA, NH, ME, RI, VT)

3 = Midwest (IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI)

4 = South (AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV)

5 = Southwest (AZ, NM, OK, TX)

6 = West (AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, WY)

Part III: Personal Demographics

Q-19 What was your age on your last birthday?

1 = Less than 30 years
2 = 30 to 39 years
3 = 40 to 49 years
4 = 50 to 59 years
5 = 60 to 69 years
6 = 70 years or more

Q-20 What is your gender?

1 = Male
2 = Female

Q-21 What is the highest level of education you have completed?

1 = High School
2 = Associate's Degree
3 = Bachelor's Degree
4 = Master's Degree
5 = Doctorate
6 = Something else (Specify _____)

Q-22 What description most accurately describes the position you now hold?
(If more than one applies, please select the one with the strongest emphasis)

1 = Sole owner of company
2 = Partner of company
3 = President or Vice President
4 = Manager (of supervisors)
5 = Supervisor (of employees/labor)
6 = Full-Time Sales/Recruiting
7 = Other (Specify _____)

Q-23 How many years have you been in this current position?

1 = Less than 2 years
2 = 2 to 5 years
3 = 6 to 10 years
4 = More than 10 years

Reminder:

- **All of your business information will be kept confidential.**
- **All of your responses will be kept confidential.**
- **Individual questionnaires will not be available to anyone.**
- **Data collected will be presented in summary form only.**
- **This survey is completely voluntary.**

Your Name: _____

Your Company: _____

Q-24 What general advice would you have for college/university **students** currently enrolled in landscape contracting (or similar) programs?

_____

_____

_____

_____

_____

_____

_____

Q-25 What general advice would you have for **faculty and staff** responsible for teaching and administering landscape contracting (or similar) programs?

_____

_____

_____

_____

_____

_____

_____

Q-26 Please provide any additional comments about this survey or landscape contracting programs in general.

_____

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU VERY MUCH!

MAILING INSTRUCTIONS

Please close and tape the edges of the booklet shut. After sealing the booklet, it will be ready to mail. The booklet is self-addressed and self-stamped. Simply deposit the booklet in the nearest mailbox. No postage is necessary.
Thank you again for your time and consideration.

APPENDIX B. ADVANCE NOTICE LETTER

June 28, 2004

<Name>
<Company>
<Address>
<Address>

Dear <Name>:

My name is Kory Beidler and I am a graduate student in the Department of Horticulture at Iowa State University (Ames). In about one week I will be mailing you a questionnaire that is critically important to my research project, but also should be of great interest to you and your business. The main objectives of my proposed study are:

1. Assess and evaluate the perceptions of landscape contracting decision-makers regarding the overall effectiveness/usefulness of college/university landscape contracting programs in preparing students for careers in this rapidly growing segment of the green industry.
2. Gather opinions and characterize perceptions of landscape contracting decision-makers regarding the relative importance of business training within the broader landscape contracting curriculum.

Your business was one of approximately 400 Associated Landscape Contractors of America (ALCA) businesses randomly selected to participate in this study. Having worked for several years in the landscape contracting segment of the green industry, I fully appreciate and understand how busy you are during the summer, but I would sincerely appreciate and value your participation in my study.

When my questionnaire arrives next week, please take a few minutes to complete it and then return it to me. Thank you in advance for your interest and cooperation.

Sincerely,

Kory Beidler
Department of Horticulture

APPENDIX C. COVER LETTERS

July 6, 2004

<Name>
<Company>
<Address>
<Address>

Dear <Name>:

As a member of the Associated Landscape Contractors of America (ALCA), your company has demonstrated its awareness and concern for the future direction of our industry. One of the greatest assets for the continued success of landscape contracting is our past, present and future graduates of two-year and four-year colleges and universities.

Working with Dr. Jeff Iles, Chair, Department of Horticulture, Iowa State University, I have designed a questionnaire that will: (1) Assess and evaluate the perceptions of landscape contracting decision-makers regarding the overall effectiveness/usefulness of college/university landscape contracting programs in preparing students for careers in this rapidly growing segment of the green industry and (2) gather the opinions and characterize perceptions of landscape contracting decision-makers regarding business training and its relative importance within the broader landscape contracting curriculum.

You may be assured all of your information and answers are completely confidential. The identification number on the questionnaire is for mailing purposes and will only be used to check your company name off the mailing list when the questionnaire is returned. This survey is voluntary and if there are any questions that you wish not to answer, feel free to skip them. But, please understand a completely answered questionnaire will contribute to a more meaningful study.

The results of this study will be used to satisfy the thesis requirement for the M.S. degree at Iowa State University. I will present only a summary of responses and never any specific responses. My intention is to publish the findings in a peer-reviewed journal and subsequently in a trade magazine. Upon completion of the study, all physical and electronic data collected will be destroyed.

I will be happy to answer any questions you may have about this study. Please call me at 515-294-2751 or email me at kmb1027@iastate.edu.

If you would prefer to speak with my supervising professor, please contact Dr. Jeff Iles (iles@iastate.edu) at 515-294-3718.

Sincerely,

Kory Beidler

August 2, 2004

<Name>
<Company>
<Address>
<Address>

Dear <Name>:

Having worked in the fast-paced and competitive world of landscape contracting for four years before returning to graduate school, I fully understand the nature of your hectic schedule and the value of each hour in your day. But your standing as a respected professional in our industry is precisely what makes your opinions very important to me and is the reason I'm seeking your assistance in completing the enclosed questionnaire.

The data from completed questionnaires will not only be used to fulfill graduate degree requirements from Iowa State University, but will also be published in a peer-reviewed journal and trade magazine, respectively. By publishing the results of my study in a respected journal, faculty and staff across the country will be more likely to respect the opinions of industry members like yourself and act upon the results given by you to improve their programs.

If you have already completed and returned a completed questionnaire by the time you get this letter, please accept my sincere thanks. If you have not yet completed a questionnaire, or never received the first one sent to you, I would like to ask once again for some of your valuable time. Completing the entire questionnaire should take no more than fifteen minutes.

You may be assured all of your information and answers are completely confidential. The identification number on the questionnaire is for mailing purposes and will only be used to check your company name off the mailing list when the questionnaire is returned. Participation in this study is voluntary and if there are any questions that you wish not to answer, feel free to skip them.

Finally, I would like to remind you that my study can only be as strong as the response rate of completed questionnaires. I assure you that each and every questionnaire of the 400 sent out to ALCA members is equally important.

I will be happy to answer any questions you may have about this study. Please call me at 515-294-2751 or email me at kmb1027@iastate.edu.

If you would prefer to speak with my supervising professor, please contact Dr. Jeff Iles (iles@iastate.edu) at 515-294-3718.

Sincerely,

Kory Beidler

APPENDIX D. REMINDER POSTCARD

Several days ago you should have received a questionnaire entitled, Evaluating the Preparedness of College/University-trained Graduates Entering the Landscape Contracting Industry: A Needs Assessment. If you have already completed and returned your questionnaire, please accept my sincere thanks. However, if you have not completed the questionnaire, I wanted to let you know there is still time to participate in this important study. Information you provide will enhance the quality and impact of our findings and benefit the entire green industry. If you did not receive our initial mailing or would like another copy of the questionnaire, please contact me at once and I will mail another one to you.

Thank you for your time and interest,

Kory Beidler

Contact Information

Kory Beidler
Department of Horticulture
Iowa State University
Ames, Iowa 50011-1100

Email: kmb1027@iastate.edu
Ph: (515) 294-2751

Table 1. Population size, sample size, and response rate.

Annual Revenue[z]	Population	Sampled	Eligible	Unlocatable	Returned	Response Rate	Weight
< 250	589	115	112	4	32	27.83	18.41
250 - 750	442	87	86	1	28	32.18	15.79
750 - 2,000	503	99	98	0	42	42.42	11.98
> 2,000	504	99	96	2	35	35.35	14.40
	N = 2038	n = 400	n = 392	7	nh = 137	34.95	

Number of sample units (SUs) known to be eligible or unkown eligibility = (# of SUs) - (# of ineligible) = 392
Number of locatable SUs = (# of SUs of known or unknown eligibility) - (# of unlocatable SUs) = 385
Location rate = (# of locatable SUs) / (Number of SUs of known or unknown eligibility) = 98.21%
Number of incomplete surveys = 3
Number of complete or nearly complete surveys = 137
Response rate = (# of complete or nearly complete surveys) / (# of SUs of known or unknown eligibility) = 34.95%

[z] Gross annual revenue in thousands of U.S. dollars.

Table 2. Responses of Associated Landscape Contractors of America industry members when asked: "Overall, what knowledge is lacking or deficient among college/university graduates entering the landscape contracting work force?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Knowledge options	Percentage of responses				
Horticulture	9.6	0.0	12.5	12.1	15.6
	[y](2.5)	(0.0)	(6.7)	(5.5)	(6.3)
Construction	25.1	32.1	25.0	27.3	15.6
	(4.0)	(8.7)	(8.7)	(7.5)	(6.3)
Design	5.1	0.0	4.2	15.2	3.1
	(1.8)	(0.0)	(4.0)	(6.1)	(3.0)
Business	53.1	57.1	54.2	39.4	59.4
	(4.6)	(9.3)	(10.4)	(8.3)	(8.5)
Adequate[x]	7.1	10.7	4.2	6.1	6.3
	(22.4)	(5.8)	(4.0)	(4.0)	(4.2)
	[w](n = 117)	(n_1 = 28)	(n_2 = 24)	(n_3 = 33)	(n_4 = 32)

[z] Gross annual revenue.

[y] Standard error.

[x] Graduates have adequate knowledge with no deficiencies in the other four choices.

[w] Total number of respondents per category.

Table 2a. Region demographics.

	Region of respondents					
	Mid-Atlantic[z]	New England[y]	Midwest[x]	South[w]	Southwest[v]	West[u]
Knowledge options	Percentage of responses					
Horticulture	9.3	15.4	18.0	3.4	7.6	0.0
	[t](6.1)	(13.9)	(5.9)	(3.2)	(7.2)	(0.0)
Construction	31.0	0.0	25.5	23.9	25.8	29.2
	(10.3)	(0.0)	(7.2)	(7.9)	(12.4)	(12.1)
Design	4.2	28.3	4.4	3.7	6.4	0.0
	(4.0)	(17.0)	(2.9)	(3.5)	(6.0)	(0.0)
Business	55.5	56.3	46.4	61.5	44.1	56.4
	(11.0)	(19.2)	(8.2)	(9.1)	(13.4)	(13.0)
Adequate[s]	0.0	0.0	5.6	7.6	16.1	14.3
	(0.0)	(0.0)	(3.7)	(5.1)	(10.3)	(9.3)
	[r](n=20)	(n=6)	(n=36)	(n=28)	(n=13)	(n=14)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Standard error.

[s] Graduates have adequate knowledge with no deficiencies in the other four choices.

[r] Total number of respondents per category.

Table 2b. Age demographics.

	Age of respondents					
	< 30[z]	30 to 39	40 to 49	50 to 59	60 to 69	> 70
Knowledge options	Percentage of responses					
Horticulture	0.0	0.0	16.2	10.3	56.9	0.0
	[y](0.0)	(0.0)	(5.1)	(5.5)	(33.4)	(0.0)
Construction	43.9	36.7	12.0	23.4	43.1	0.0
	(12.3)	(9.4)	(4.5)	(8.3)	(33.4)	(0.0)
Design	4.7	6.1	2.1	10.7	0.0	0.0
	(4.4)	(4.0)	(2.0)	(5.7)	(0.0)	(0.0)
Business	51.5	45.7	60.2	52.5	0.0	0.0
	(12.4)	(9.5)	(7.0)	(9.6)	(0.0)	(0.0)
Adequate[x]	0.0	11.5	9.6	3.2	0.0	0.0
	(0.0)	(6.2)	(4.4)	(3.1)	(0.0)	(0.0)
	[w](n=16)	(n=26)	(n=48)	(n=25)	(n=13)	(n=0)

[z] Age categories in years.

[y] Standard error.

[x] Graduates have adequate knowledge with no deficiencies in the other four choices.

[w] Total number of respondents per category.

Table 2c. Gender demographics.

	Gender of respondents	
	Male	Female
Knowledge options	Percentage of responses	
Horticulture	9.2	11.5
	[z](2.7)	(7.4)
Construction	28.1	7.3
	(4.5)	(6.9)
Design	6.0	0.0
	(2.1)	(0.0)
Business	50.2	70.1
	(4.9)	(11.1)
Adequate[y]	6.4	11.1
	(2.5)	(7.2)
	[x](n=101)	(n=16)

[z] Standard error.

[y] Graduates have adequate knowledge with no deficiencies in the other four choices.

[x] Total number of respondents per category.

Table 2d. Education demographics.

	Highest education level of respondents					
	High school[z]	Associate's	Bachelor's	Master's	Doctorate	Other
Knowledge options	Percentage of responses					
Horticulture	14.2	9.9	8.5	11.1	0.0	0.0
	[y](7.4)	(6.4)	(3.2)	(10.2)	(0.0)	(0.0)
Construction	35.6	13.2	29.9	0.0	0.0	0.0
	(11.2)	(7.0)	(5.5)	(0.0)	(0.0)	(0.0)
Design	5.3	0.0	6.3	0.0	0.0	27.5
	(5.0)	(0.0)	(2.6)	(0.0)	(0.0)	(23.3)
Business	39.5	66.1	49.8	71.9	0.0	72.5
	(11.4)	(10.3)	(6.0)	(16.9)	(0.0)	(23.3)
Adequate[x]	5.3	10.7	5.6	17.1	0.0	0.0
	(5.0)	(7.1)	(2.7)	(15.0)	(0.0)	(0.0)
	[w](n=18)	(n=20)	(n=69)	(n=7)	(n=0)	(n=3)

[z] Highest educational degree completed.

[y] Standard error.

[x] Graduates have adequate knowledge with no deficiencies in the other four choices.

[w] Total number of respondents per category.

Table 2e. Job position demographics.

	Position of respondents						
	Sole owner[z]	Partner[y]	Pres. or v.p.[x]	Manager[w]	Supervisor[v]	Sales/recruit.[u]	Other[t]
Knowledge options	Percentage of responses						
Horticulture	9.3	15.4	18.0	3.4	7.6	0.0	0.0
	[s](6.1)	(13.9)	(5.9)	(3.2)	(7.2)	(0.0)	(0.0)
Construction	31.0	0.0	25.5	23.9	25.8	29.2	64.7
	(10.3)	(0.0)	(7.2)	(7.9)	(12.4)	(12.1)	(27.3)
Design	4.2	28.3	4.4	3.7	6.4	0.0	0.0
	(4.0)	(17.0)	(2.9)	(3.5)	(6.0)	(0.0)	(0.0)
Business	55.5	56.3	46.4	61.5	44.1	56.4	35.3
	(11.0)	(19.2)	(8.2)	(9.1)	(13.4)	(13.0)	(27.3)
Adequate[r]	0.0	0.0	5.6	7.6	16.1	14.3	0.0
	(0.0)	(0.0)	(3.7)	(5.1)	(10.3)	(9.3)	(0.0)
	[q](n=47)	(n=14)	(n=33)	(n=15)	(n=3)	(n=2)	(n=3)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[s] Standard error.

[r] Graduates have adequate knowledge with no deficiencies in the other four choices.

[q] Total number of respondents per category.

Table 3. Responses of Associated Landscape Contractors of America industry members when asked: "Are most colleges and universities that provide landscape contracting programs in touch with the needs and expectations of industry?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Yes	31.7	33.3	40.7	23.7	29.4
	[y](4.1)	(8.5)	(9.3)	(6.7)	(7.7)
No	39.1	23.3	37.0	42.1	55.9
	(4.1)	(7.6)	(9.2)	(7.8)	(8.3)
No opinion	29.2	43.3	22.2	34.2	14.7
	(3.9)	(9.0)	(7.9)	(7.5)	(6.0)
	[x](n = 129)	(n_1 = 30)	(n_2 = 27)	(n_3 = 38)	(n_4 = 34)

[z] Gross annual revenue.

[y] Standard error.

[x] Total number of respondents per category.

Table 3a. Region demographics.

	Region of respondents					
	Mid-Atlantic[z]	New England[y]	Midwest[x]	South[w]	Southwest[v]	West[u]
Response options	Percentage of responses					
Yes	38.6	17.1	18.6	51.8	23.5	28.7
	[t](10.3)	(14.9)	(6.3)	(8.9)	(11.5)	(10.1)
No	56.2	41.6	48.4	17.6	45.9	31.7
	(10.6)	(18.4)	(8.0)	(6.4)	(12.9)	(10.5)
No opinion	5.3	41.4	33.0	30.5	30.6	39.6
	(5.0)	(18.0)	(7.5)	(8.3)	(12.3)	(11.2)
	[s](n=21)	(n=7)	(n=38)	(n=31)	(n=14)	(n=18)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Standard error.

[s] Total number of respondents per category.

Table 3b. Age demographics.

	Age of respondents					
	< 30[z]	30 to 39	40 to 49	50 to 59	60 to 69	> 70
Response options	Percentage of responses					
Yes	48.8	37.4	25.4	25.7	43.1	0.0
	[y](12.0)	(8.9)	(5.9)	(8.3)	(33.4)	(0.0)
No	27.3	47.7	40.0	34.9	56.9	0.0
	(10.2)	(9.2)	(6.5)	(8.9)	(33.4)	(0.0)
No opinion	23.9	14.9	34.6	39.4	0.0	0.0
	(10.3)	(6.7)	(6.4)	(9.2)	(0.0)	(0.0)
	[x](n=17)	(n=29)	(n=53)	(n=28)	(n=2)	(n=0)

[z] Age categories in years.

[y] Standard error.

[x] Total number of respondents per category.

Table 3c. Gender demographics.

	Gender of respondents	
	Male	Female
Response options	Percentage of responses	
Yes	32.2	28.9
	[z](4.4)	(10.7)
No	40.7	29.4
	(4.5)	(9.9)
No opinion	27.1	41.7
	(4.1)	(11.3)
	[y](n=111)	(n=18)

[z] Standard error.

[y] Total number of respondents per category.

Table 3d. Education demographics.

	Highest education level of respondents					
	High school[z]	Associate's	Bachelor's	Master's	Doctorate	Other
Response options	Percentage of responses					
Yes	26.0	51.6	30.5	0.0	0.0	72.5
	[y](9.8)	(11.0)	(5.3)	(0.0)	(0.0)	(23.3)
No	35.8	28.1	41.9	50.7	0.0	27.5
	(10.6)	(9.5)	(5.6)	(14.4)	(0.0)	(23.3)
No opinion	38.2	20.3	27.6	49.3	0.0	0.0
	(10.6)	(8.9)	(5.1)	(14.4)	(0.0)	(0.0)
	[x](n=20)	(n=20)	(n=75)	(n=11)	(n=0)	(n=3)

[z] Highest educational degree completed.

[y] Standard error.

[x] Total number of respondents per category.

Table 3e. Job position demographics.

	Position of respondents						
	Sole owner[z]	Partner[y]	Pres. or v.p.[x]	Manager[w]	Supervisor[v]	Sales/recruit.[u]	Other[t]
Response options	Percentage of responses						
Yes	27.3	42.1	27.8	23.2	62.1	100.0	64.7
	[s](6.1)	(12.7)	(7.4)	(10.0)	(28.0)	(0.0)	(27.3)
No	37.0	45.4	44.9	40.3	0.0	0	35.3
	(6.6)	(12.7)	(7.9)	(11.6)	(0.0)	(0.0)	(27.3)
No opinion	35.7	12.6	27.4	36.5	37.9	0.0	0.0
	(6.6)	(8.1)	(7.2)	(11.4)	(28.0)	(0.0)	(0.0)
	[r](n=52)	(n=15)	(n=37)	(n=17)	(n=3)	(n=2)	(n=3)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[s] Standard error.

[r] Total number of respondents per category.

Table 4. Responses of Associated Landscape Contractors of America industry members when asked: "Should green industry professionals be invited to take a more active role in shaping the menu of courses required of landscape contracting undergraduates?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Yes[y]	96.7	93.3	100.0	97.4	97.1
	[x](1.6)	(4.5)	(0.0)	(2.5)	(2.8)
No[w]	3.3	6.7	0.0	2.6	2.9
	(1.6)	(4.5)	(0.0)	(2.5)	(2.8)
	[v](n = 129)	(n = 30)	(n = 27)	(n = 38)	(n = 34)

[z] Gross annual revenue.

[y] Yes, industry members should be involved in academic decision-making.

[x] Standard error.

[w] No, industry members should not be involved in academic decision-making.

[v] Total number of respondents per category.

Table 4a. Region demographics.

	Region of respondents					
	Mid-Atlantic[z]	New England[y]	Midwest[x]	South[w]	Southwest[v]	West[u]
Response options	Percentage of responses					
Yes[t]	93.9	100.0	97.9	93.0	100.0	100.0
	[s](5.7)	(0.0)	(2.0)	(4.7)	(0.0)	(0.0)
No[r]	6.1	0.0	2.1	7.0	0.0	0.0
	(5.7)	(0.0)	(2.0)	(4.7)	(0.0)	(0.0)
	[q](n=21)	(n=7)	(n=38)	(n=31)	(n=14)	(n=18)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Yes, most universities and colleges are in touch with industry's needs.

[s] Standard error.

[r] No, most universities and colleges are not in touch with industry's needs.

[q] Total number of respondents per category.

Table 4b. Age demographics.

	Age of respondents					
	< 30[z]	30 to 39	40 to 49	50 to 59	60 to 69	> 70
Response options	Percentage of responses					
Yes[y]	93.2	93.9	97.6	100.0	100.0	0.0
	[x](6.4)	(4.1)	(2.3)	(0.0)	(0.0)	(0.0)
No[w]	6.8	6.1	2.4	0.0	0.0	0.0
	(6.4)	(4.1)	(2.3)	(0.0)	(0.0)	(0.0)
	[v](n=17)	(n=29)	(n=53)	(n=28)	(n=2)	(n=0)

[z] Age categories in years.

[y] Yes, most universities and colleges are in touch with industry's needs.

[x] Standard error.

[w] No, most universities and colleges are not in touch with industry's needs.

[v] Total number of respondents per category.

Table 4c. Gender demographics.

	Gender of respondents	
	Male	Female
Response options	Percentage of responses	
Yes[z]	96.9	95.7
	[y](1.7)	(4.1)
No[x]	3.1	4.3
	(1.7)	(4.1)
	[w](n=111)	(n=18)

[z] Yes, most universities and colleges are in touch with industry's needs.

[y] Standard error.

[x] No, most universities and colleges are not in touch with industry's needs.

[w] Total number of respondents per category.

Table 4d. Education demographics.

	Highest education level of respondents					
	High school[z]	Associate's	Bachelor's	Master's	Doctorate	Other
Response options	Percentage of responses					
Yes[y]	95.1	94.2	98.3	92.5	0.0	100.0
	[y](4.6)	(5.5)	(1.6)	(7.0)	(0.0)	(0.0)
No[w]	4.9	5.8	1.7	7.5	0.0	0.0
	(4.6)	(5.5)	(1.6)	(7.0)	(0.0)	(0.0)
	[x](n=20)	(n=20)	(n=75)	(n=11)	(n=0)	(n=3)

[z] Highest educational degree completed.

[y] Yes, most universities and colleges are in touch with industry's needs.

[y] Standard error.

[w] No, most universities and colleges are not in touch with industry's needs.

[x] Total number of respondents per category.

Table 4e. Job position demographics.

	Position of respondents						
	Sole owner[z]	Partner[y]	Pres. or v.p.[x]	Manager[w]	Supervisor[v]	Sales/recruit.[u]	Other[t]
Response options	Percentage of responses						
Yes[s]	97.6	94.0	96.6	95.0	100.0	100.0	100.0
	[r](2.3)	(5.6)	(3.2)	(4.7)	(0.0)	(0.0)	(0.0)
No[q]	2.4	6.0	3.4	5.0	0	0	0
	(2.3)	(5.6)	(3.2)	(4.7)	(0.0)	(0.0)	(0.0)
	[p](n=52)	(n=15)	(n=37)	(n=17)	(n=3)	(n=2)	(n=3)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[s] Yes, most universities and colleges are in touch with industry's needs.

[r] Standard error.

[q] No, most universities and colleges are not in touch with industry's needs.

[p] Total number of respondents per category.

Table 5. Responses of Associated Landscape Contractors of America industry members when asked: "What role should colleges and universities play in educating undergraduate students in landscape contracting (or similar) programs?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Teaching options	Percentage of responses				
Specific Skills[y]	9.8	6.7	11.1	13.2	9.1
	[x](2.6)	(4.5)	(6.0)	(5.3)	(4.9)
Practical & Theoretical[w]	69.9	70.0	59.3	73.7	75.8
	(4.0)	(8.3)	(9.3)	(6.9)	(7.3)
Critical Thinking[v]	15.1	16.7	18.5	13.2	12.1
	(3.2)	(6.7)	(7.4)	(5.3)	(5.6)
Other[u]	5.2	6.7	11.1	0.0	3.0
	(2.0)	(4.5)	(6.0)	(0.0)	(2.9)
	[t](n = 128)	(n = 30)	(n = 27)	(n = 38)	(n = 33)

[z] Gross annual revenue.

[x] Standard error.

[w] Prepare students for careers by blending both practical & theoretical material.

[v] Develop student's critical thinking capacities & problem solving skills with little emphasis on specific skills.

[u] Respondents wrote something 'other' than the three choices provided.

[t] Total number of respondents per category.

Table 5a. Region demographics.

	Region of respondents					
	Mid-Atlantic[z]	New England[y]	Midwest[x]	South[w]	Southwest[v]	West[u]
Teaching options	Percentage of responses					
Specific skills[t]	5.2	13.4	12.2	7.8	12.8	9.8
	[s](5.0)	(12.2)	(4.9)	(5.1)	(8.3)	(6.4)
Practical and theoretical[r]	85.2	58.6	61.9	68.7	75.7	71.7
	(7.7)	(18.0)	(7.9)	(8.4)	(10.4)	(10.6)
Critical thinking[q]	9.6	14.7	22.6	12.9	11.6	12.7
	(6.2)	(13.1)	(6.9)	(6.0)	(7.4)	(8.2)
Other[p]	0.0	13.4	3.3	10.6	0.0	5.8
	(0.0)	(12.2)	(3.2)	(5.7)	(0.0)	(5.5)
	[o](n=21)	(n=7)	(n=37)	(n=31)	(n=14)	(n=18)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Help students develop specific skills for specific careers.

[s] Standard error.

[r] Prepare students for careers by blending both partical & theoretical material.

[q] Develop student's critical thinking capacities & problem solving skills with little emphasis on specific skills.

[p] Respondents wrote something 'other' than the three choices provided.

[o] Total number of respondents per category.

Table 5b. Age demographics.

	Age of respondents					
	< 30[z]	30 to 39	40 to 49	50 to 59	60 to 69	> 70
Teaching options	Percentage of responses					
Specific skills[y]	0.0	10.7	12.9	6.4	56.9	0.0
	[x](0.0)	(5.8)	(4.5)	(4.2)	(33.4)	(0.0)
Practical and theoretical[w]	82.0	68.2	70.2	65.1	43.1	0.0
	(9.3)	(8.7)	(6.2)	(8.9)	(33.4)	(0.0)
Critical thinking[v]	18.0	12.9	14.9	16.9	0.0	0.0
	(9.3)	(5.9)	(5.0)	(6.9)	(0.0)	(0.0)
Other[u]	0.0	8.2	2.0	11.7	0.0	0.0
	(0.0)	(5.4)	(2.0)	(6.2)	(0.0)	(0.0)
	[t](n=17)	(n=28)	(n=53)	(n=28)	(n=2)	(n=0)

[z] Age categories in years.

[y] Help students develop specific skills for specific careers.

[x] Standard error.

[w] Prepare students for careers by blending both partical & theoretical material.

[v] Develop student's critical thinking capacities & problem solving skills with little emphasis on specific skills.

[u] Respondents wrote something 'other' than the three choices provided.

[t] Total number of respondents per category.

Table 5c. Gender demographics.

	Gender of respondents	
	Male	Female
Teaching options	Percentage of responses	
Specific skills[z]	8.8	16.0
	[y](2.6)	(8.3)
Practical and theoretical[x]	69.3	73.9
	(4.3)	(9.9)
Critical thinking[w]	15.9	10.0
	(3.5)	(6.6)
Other[v]	6.0	0.0
	(2.3)	(0.0)
	[u](n=111)	(n=17)

[z] Help students develop specific skills for specific careers.

[y] Standard error.

[x] Prepare students for careers by blending both partical & theoretical material.

[w]Develop student's critical thinking capacities & problem solving skills with little emphasis on specific skills.

[v] Respondents wrote something 'other' than the three choices provided.

[u] Total number of respondents per category.

Table 5d. Education demographics.

	Highest education level of respondents					
	High school[z]	Associate's	Bachelor's	Master's	Doctorate	Other
Teaching options	Percentage of responses					
Specific skills[y]	18.5	24.8	3.6	9.8	0.0	0.0
	[x](8.2)	(9.5)	(2.0)	(9.1)	(0.0)	(0.0)
Practical and theoretical[w]	76.1	48.0	76.2	59.6	0.0	63.8
	(9.2)	(11.0)	(4.8)	(15.4)	(0.0)	(27.8)
Critical thinking[v]	5.4	16.5	14.4	30.6	0.0	36.2
	(5.1)	(8.5)	(4.0)	(14.6)	(0.0)	(27.8)
Other[u]	0.0	10.7	5.8	0.0	0.0	0.0
	(0.0)	(7.1)	(2.8)	(0.0)	(0.0)	(0.0)
	[w](n=20)	(n=20)	(n=75)	(n=10)	(n=0)	(n=3)

[z] Highest educational degree completed.

[y] Help students develop specific skills for specific careers.

[x] Standard error.

[w] Prepare students for careers by blending both partical & theoretical material.

[v] Develop student's critical thinking capacities & problem solving skills with little emphasis on specific skills.

[u] Respondents wrote something 'other' than the three choices provided.

[t] Total number of respondents per category.

Table 5e. Job position demographics.

	Position of respondents						
	Sole owner[z]	Partner[y]	Pres. or v.p.[x]	Manager[w]	Supervisor[v]	Sales/recruit.[u]	Other[t]
Teaching options	Percentage of responses						
Specific skills[s]	4.1	20.2	10.2	22.2	0.0	0.0	0.0
	[r](2.7)	(10.3)	(4.8)	(9.6)	(0.0)	(0.0)	(0.0)
Practical / theoretical[q]	73.2	68.3	75.4	40.9	100.0	43.9	100
	(6.1)	(11.7)	(7.1)	(11.7)	(0.0)	(33.7)	(0.0)
Critical thinking[p]	11.9	11.5	14.4	30.9	0.0	56.1	0.0
	(4.5)	(7.6)	(5.9)	(11.2)	(0.0)	(33.7)	(0.0)
Other[o]	10.8	0.0	0.0	6.1	0.0	0.0	0.0
	(4.4)	(0.0)	(0.0)	(5.7)	(0.0)	(0.0)	(0.0)
	[n](n=52)	(n=15)	(n=36)	(n=17)	(n=3)	(n=2)	(n=3)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[y] Help students develop specific skills for specific careers.

[x] Standard error.

[w] Prepare students for careers by blending both partical & theoretical material.

[v] Develop student's critical thinking capacities & problem solving skills with little emphasis on specific skills.

[u] Respondents wrote something 'other' than the three choices provided.

[q] Total number of respondents per category.

Table 6. Responses of Associated Landscape Contractors of America industry members when asked to rate[z] topics from a list that could be taught in any landscape contracting undergraduate program. Response options are ranked in descending order using the overall mean.

	Annual revenue[y] (thousands of U.S. dollars)									
	Overall		< 250		250 - 750		750 - 2,000		> 2,000	
Topic options	Mean rating of responses									
Management (personnel)	4.54	[x](n=136)	4.53	(n=32)	4.50	(n=28)	4.46	(n=41)	4.66	(n=35)
Estimating and bidding	4.53	(n=136)	4.48	(n=31)	4.43	(n=28)	4.56	(n=42)	4.63	(n=35)
Management (clientele)	4.46	(n=137)	4.44	(n=32)	4.50	(n=28)	4.38	(n=42)	4.51	(n=35)
General design principles	4.41	(n=127)	4.44	(n=27)	4.33	(n=27)	4.48	(n=40)	4.36	(n=33)
Plant ID (trees / shrubs)	4.39	(n=137)	4.31	(n=32)	4.29	(n=28)	4.56	(n=42)	4.39	(n=35)
Plant ID (perennial / annual)	4.26	(n=137)	4.19	(n=32)	4.04	(n=28)	4.43	(n=42)	4.36	(n=35)
Plant establishment / maintenance	4.19	(n=137)	4.09	(n=32)	4.25	(n=28)	4.21	(n=42)	4.24	(n=35)
Grading and drainage	4.19	(n=128)	4.15	(n=27)	4.07	(n=27)	4.29	(n=41)	4.21	(n=33)
Production management	4.18	(n=137)	4.13	(n=32)	4.21	(n=28)	4.10	(n=42)	4.30	(n=35)
Computer skills	4.08	(n=131)	4.07	(n=27)	3.93	(n=28)	4.07	(n=42)	4.24	(n=34)
Designing residential	4.04	(n=126)	4.26	(n=27)	4.07	(n=27)	4.18	(n=40)	3.63	(n=32)
Developing a business plan	3.95	(n=137)	4.25	(n=32)	4.04	(n=28)	3.79	(n=42)	3.69	(n=35)
Business writing	3.93	(n=130)	3.96	(n=27)	3.86	(n=28)	3.76	(n=42)	4.12	(n=33)
Spanish	3.92	(n=131)	3.48	(n=27)	4.04	(n=28)	3.98	(n=42)	4.21	(n=34)
Public speaking	3.80	(n=130)	3.89	(n=27)	3.75	(n=28)	3.86	(n=42)	3.70	(n=33)
Designing commercial	3.78	(n=126)	4.11	(n=27)	3.78	(n=27)	3.60	(n=40)	3.63	(n=32)

[z] Rating scale: (1) not important, (2) below average importance, (3) average importance, (4) above average importance, and (5) very important.

[y] Gross annual revenue.

[x] Total number of responses per category.

Table 6. (continued)

	Overall		< 250		250 - 750		750 - 2,000		> 2,000	
Turfgrass management	3.77	(n=136)	3.84	(n=32)	3.74	(n=27)	3.89	(n=42)	3.57	(n=35)
Plant pathology	3.73	(n=136)	3.75	(n=32)	3.70	(n=27)	3.60	(n=42)	3.87	(n=35)
Finance	3.72	(n=135)	3.72	(n=32)	4.00	(n=28)	3.54	(n=41)	3.65	(n=34)
Marketing	3.70	(n=137)	3.97	(n=32)	3.89	(n=28)	3.50	(n=42)	3.40	(n=35)
Entomology	3.69	(n=137)	3.66	(n=32)	3.68	(n=28)	3.82	(n=42)	3.61	(n=35)
Irrigation	3.68	(n=136)	3.88	(n=32)	3.50	(n=28)	3.66	(n=41)	3.63	(n=35)
Introduction to soils	3.59	(n=136)	3.53	(n=32)	3.67	(n=27)	3.50	(n=42)	3.67	(n=35)
Arboriculture	3.57	(n=136)	3.69	(n=32)	3.67	(n=27)	3.48	(n=42)	3.43	(n=35)
Business administration	3.54	(n=137)	3.56	(n=32)	3.64	(n=28)	3.67	(n=42)	3.31	(n=35)
Surveying	3.53	(n=128)	3.56	(n=27)	3.41	(n=27)	3.63	(n=41)	3.52	(n=33)
Accounting	3.45	(n=137)	3.47	(n=32)	3.50	(n=28)	3.31	(n=42)	3.53	(n=35)
Multimedia presentations	3.32	(n=129)	3.48	(n=27)	3.39	(n=28)	3.12	(n=42)	3.28	(n=32)
Plant biology	3.31	(n=137)	3.34	(n=32)	3.32	(n=28)	3.17	(n=42)	3.40	(n=35)
Plant physiology	3.31	(n=137)	3.34	(n=32)	3.43	(n=28)	3.21	(n=42)	3.26	(n=35)
Business law	2.95	(n=137)	2.97	(n=32)	3.14	(n=28)	3.05	(n=42)	2.66	(n=35)
Plant propagation	2.74	(n=136)	2.97	(n=32)	2.74	(n=27)	2.48	(n=42)	2.73	(n=35)

Table 6a. Region demographics.

	Region of respondents											
	Mid-Atlantic[z]		New England[y]		Midwest[x]		South[w]		Southwest[v]		West[u]	
Topic options	Mean rating of responses											
Accounting	3.33	[t](0.16)	3.67	(0.27)	3.28	(0.14)	3.52	(0.16)	3.73	(0.17)	3.52	(0.22)
Business administration	3.54	(0.17)	3.59	(0.17)	3.34	(0.15)	3.62	(0.16)	3.79	(0.21)	3.62	(0.24)
Business law	2.90	(0.16)	3.04	(0.23)	2.63	(0.16)	3.01	(0.16)	3.19	(0.28)	3.35	(0.25)
Marketing	3.57	(0.17)	3.11	(0.23)	3.66	(0.13)	3.75	(0.14)	3.99	(0.17)	3.88	(0.21)
Developing a business plan	3.96	(0.17)	3.48	(0.27)	4.01	(0.14)	4.01	(0.16)	4.04	(0.25)	3.85	(0.21)
Finace	3.39	(0.17)	3.85	(0.31)	3.84	(0.13)	3.74	(0.19)	3.60	(0.21)	3.85	(0.16)
Estimating and bidding	4.68	(0.09)	4.74	(0.16)	4.51	(0.11)	4.26	(0.17)	4.79	(0.17)	4.55	(0.15)
Management (personnel)	4.55	(0.12)	4.60	(0.24)	4.60	(0.09)	4.44	(0.12)	4.64	(0.19)	4.48	(0.16)
Management (clientele)	4.43	(0.13)	4.26	(0.38)	4.57	(0.10)	4.25	(0.13)	4.71	(0.19)	4.53	(0.16)
Production management	4.58	(0.13)	4.05	(0.30)	4.00	(0.14)	4.18	(0.12)	4.47	(0.17)	3.90	(0.22)
Plant ID (trees/shrubs)	4.53	(0.12)	4.15	(0.29)	4.40	(0.12)	4.52	(0.14)	3.99	(0.19)	4.34	(0.20)
Plant ID (perennial/annual)	4.41	(0.14)	4.03	(0.27)	3.34	(0.12)	4.37	(0.14)	3.84	(0.22)	4.12	(0.21)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Standard error.

Table 6a. (continued)

	Mid-Atlantic[z]		New England[y]		Midwest[x]		South[w]		Southwest[v]		West[u]	
Entomology	3.61	(0.19)	3.58	(0.23)	3.73	(0.15)	3.83	(0.13)	3.65	(0.20)	3.54	(0.24)
Irrigation	3.48	(0.17)	3.36	(0.29)	3.45	(0.11)	3.62	(0.12)	4.01	(0.27)	4.41	(0.22)
Plant establishment/maintenance	4.29	(0.13)	4.32	(0.15)	4.21	(0.11)	4.06	(0.17)	4.03	(0.25)	4.36	(0.16)
Plant biology	3.32	(0.17)	3.65	(0.23)	3.23	(0.10)	3.26	(0.16)	3.61	(0.23)	3.18	(0.22)
Plant physiology	3.23	(0.18)	3.89	(0.19)	3.29	(0.10)	3.26	(0.17)	3.52	(0.30)	3.13	(0.21)
Turfgrass management	3.69	(0.18)	3.70	(0.28)	3.61	(0.11)	3.86	(0.16)	3.88	(0.21)	3.96	(0.23)
Introduction to soils	3.62	(0.20)	3.72	(0.27)	3.34	(0.10)	3.61	(0.12)	3.85	(0.24)	3.78	(0.23)
Plant pathology	3.63	(0.16)	3.60	(0.28)	3.74	(0.12)	3.80	(0.15)	3.80	(0.26)	3.74	(0.21)
Arboriculture	3.60	(0.17)	3.71	(0.32)	3.54	(0.12)	3.39	(0.16)	3.71	(0.23)	3.71	(0.25)
Plant propagation	2.82	(0.20)	3.16	(0.21)	2.72	(0.13)	2.70	(0.17)	2.93	(0.32)	2.42	(0.28)
Desiging residential	4.36	(0.14)	3.85	(0.29)	4.00	(0.14)	4.10	(0.17)	3.74	(0.19)	3.87	(0.25)
Designing commercial	3.69	(0.20)	3.46	(0.27)	3.89	(0.12)	3.95	(0.16)	3.76	(0.18)	3.55	(0.19)
General design priciples	4.57	(0.12)	4.53	(0.19)	4.57	(0.10)	4.36	(0.12)	3.92	(0.22)	4.23	(0.19)
Surveying	3.86	(0.19)	3.95	(0.28)	3.41	(0.16)	3.48	(0.19)	3.56	(0.19)	3.24	(0.28)
Grading and drainage	4.33	(0.15)	4.27	(0.16)	4.05	(0.12)	4.35	(0.12)	3.88	(0.19)	4.16	(0.26)
Computer skills	4.24	(0.13)	4.12	(0.29)	4.05	(0.12)	4.09	(0.10)	4.11	(0.17)	3.91	(0.25)
Public speaking	4.01	(0.17)	3.53	(0.19)	3.76	(0.13)	3.82	(0.14)	4.13	(0.17)	3.49	(0.22)
Business writing	3.95	(0.16)	3.85	(0.23)	3.89	(0.14)	3.89	(0.12)	4.45	(0.14)	3.69	(0.17)
Multimedia presentations	3.56	(0.15)	3.05	(0.44)	3.13	(0.12)	3.41	(0.17)	3.62	(0.17)	3.12	(0.22)
Spanish	4.18	(0.18)	4.29	(0.26)	3.74	(0.16)	3.86	(0.19)	4.29	(0.20)	3.66	(0.27)

Table 6b. Age demographics.

	Age of respondents											
	< 30[z]		30 to 39		40 to 49		50 to 59		60 to 69		> 70	
Topic options	Mean rating of responses											
Accounting	3.05	[y](0.12)	3.54	(0.16)	3.57	(0.12)	3.41	(0.19)	3.30	(0.25)	0.00	(0.00)
Business administration	3.62	(0.18)	3.39	(0.16)	3.59	(0.12)	3.54	(0.17)	3.90	(0.47)	0.00	(0.00)
Business law	2.75	(0.13)	2.94	(0.21)	2.97	(0.14)	3.02	(0.18)	3.40	(0.28)	0.00	(0.00)
Marketing	3.60	(0.17)	3.69	(0.16)	3.64	(0.11)	3.86	(0.14)	3.90	(0.47)	0.00	(0.00)
Developing a business plan	4.11	(0.18)	4.17	(0.17)	3.80	(0.13)	3.88	(0.15)	4.00	(0.42)	0.00	(0.00)
Finace	3.62	(0.16)	4.00	(0.14)	3.71	(0.13)	3.48	(0.17)	4.00	(0.00)	0.00	(0.00)
Estimating and bidding	4.66	(0.14)	4.67	(0.09)	4.45	(0.11)	4.41	(0.13)	4.70	(0.25)	0.00	(0.00)
Management (personnel)	4.50	(0.16)	4.67	(0.10)	4.51	(0.09)	4.51	(0.13)	4.30	(0.25)	0.00	(0.00)
Management (clientele)	4.59	(0.16)	4.58	(0.10)	4.47	(0.09)	4.19	(0.16)	4.70	(0.25)	0.00	(0.00)
Production management	3.36	(0.17)	4.21	(0.13)	4.30	(0.11)	3.83	(0.17)	4.00	(0.00)	0.00	(0.00)
Plant ID (trees/shrubs)	4.53	(0.17)	4.12	(0.15)	4.49	(0.09)	4.34	(0.16)	4.70	(0.25)	0.00	(0.00)
Plant ID (perennial/annual)	4.40	(0.18)	4.02	(0.14)	4.34	(0.10)	4.24	(0.17)	4.40	(0.50)	0.00	(0.00)
Entomology	3.61	(0.19)	3.48	(0.17)	3.75	(0.12)	3.83	(0.15)	4.10	(0.47)	0.00	(0.00)
Irrigation	3.69	(0.22)	3.86	(0.14)	3.71	(0.12)	3.49	(0.15)	3.00	(0.00)	0.00	(0.00)
Plant establishment/maintenance	4.46	(0.16)	4.14	(0.12)	4.12	(0.12)	4.18	(0.13)	4.70	(0.25)	0.00	(0.00)
Plant biology	3.47	(0.19)	3.30	(0.11)	3.14	(0.13)	3.51	(0.14)	3.40	(0.28)	0.00	(0.00)
Plant physiology	3.38	(0.23)	3.10	(0.12)	3.23	(0.12)	3.58	(0.13)	3.80	(0.56)	0.00	(0.00)
Turfgrass management	3.81	(0.19)	3.68	(0.16)	3.84	(0.11)	3.70	(0.17)	3.70	(0.25)	0.00	(0.00)

[z] Age categories in years.

[y] Standard error.

Table 6b. (continued)

	< 30[z]		30 to 39		40 to 49		50 to 59		60 to 69		> 70	
Introduction to soils	3.88	(0.22)	3.37	(0.12)	3.60	(0.11)	3.56	(0.15)	4.10	(0.47)	0.00	(0.00)
Plant pathology	3.77	(0.22)	3.57	(0.14)	3.82	(0.11)	3.71	(0.14)	3.80	(0.56)	0.00	(0.00)
Arboriculture	3.75	(0.19)	3.28	(0.15)	3.71	(0.12)	3.49	(0.16)	3.40	(0.28)	0.00	(0.00)
Plant propagation	3.24	(0.25)	2.74	(0.18)	2.52	(0.13)	2.75	(0.14)	3.40	(0.28)	0.00	(0.00)
Desiging residential	4.39	(0.16)	4.09	(0.13)	4.13	(0.12)	3.59	(0.20)	3.60	(0.50)	0.00	(0.00)
Designing commercial	4.11	(0.19)	3.73	(0.18)	3.83	(0.10)	3.57	(0.16)	3.30	(0.25)	0.00	(0.00)
General design priciples	4.72	(0.13)	4.29	(0.14)	4.47	(0.09)	4.20	(0.17)	4.30	(0.25)	0.00	(0.00)
Surveying	3.64	(0.23)	3.67	(0.15)	3.49	(0.14)	3.31	(0.20)	4.10	(0.75)	0.00	(0.00)
Grading and drainage	4.24	(0.13)	4.21	(0.12)	4.30	(0.11)	3.85	(0.20)	4.40	(0.50)	0.00	(0.00)
Computer skills	3.93	(0.19)	3.93	(0.14)	4.19	(0.10)	4.16	(0.14)	3.60	(0.50)	0.00	(0.00)
Public speaking	4.11	(0.20)	3.74	(0.15)	3.82	(0.11)	3.62	(0.14)	3.90	(0.47)	0.00	(0.00)
Business writing	3.96	(0.17)	3.96	(0.15)	3.92	(0.10)	3.82	(0.14)	4.40	(0.50)	0.00	(0.00)
Multimedia presentations	3.45	(0.25)	3.41	(0.16)	3.18	(0.12)	3.40	(0.14)	3.30	(0.25)	0.00	(0.00)
Spanish	3.52	(0.27)	4.30	(0.19)	4.06	(0.12)	3.50	(0.19)	4.00	(0.42)	0.00	(0.00)

Table 6c. Gender demographics.

	Gender of respondents			
	Male		Female	
Topic options	Mean rating of responses			
Accounting	3.41	[z](0.08)	3.75	(0.21)
Business administration	3.54	(0.08)	3.59	(0.20)
Business law	2.93	(0.09)	3.07	(0.22)
Marketing	3.69	(0.08)	3.74	(0.17)
Developing a business plan	3.92	(0.09)	4.12	(0.16)
Finace	3.72	(0.08)	3.72	(0.20)
Estimating and bidding	4.53	(0.07)	4.51	(0.16)
Management (personnel)	4.55	(0.06)	4.50	(0.21)
Management (clientele)	4.45	(0.06)	4.53	(0.19)
Production management	4.19	(0.07)	4.11	(0.24)
Plant ID (trees/shrubs)	4.39	(0.07)	4.37	(0.20)
Plant ID (perennial/annual)	4.24	(0.07)	4.37	(0.20)
Entomology	3.66	(0.08)	3.87	(0.22)
Irrigation	3.67	(0.08)	3.72	(0.23)
Plant establishment/maintenance	4.15	(0.08)	4.45	(0.14)
Plant biology	3.26	(0.08)	3.63	(0.20)
Plant physiology	3.25	(0.09)	3.69	(0.19)
Turfgrass management	3.78	(0.08)	3.67	(0.23)
Introduction to soils	3.59	(0.07)	3.57	(0.23)

[z] Standard error.

Table 6c. (continued)

	Male		Female	
Plant pathology	3.70	(0.08)	3.94	(0.21)
Arboriculture	3.55	(0.08)	3.65	(0.25)
Plant propagation	2.67	(0.09)	3.20	(0.26)
Desiging residential	4.09	(0.08)	3.68	(0.25)
Designing commercial	3.79	(0.08)	3.74	(0.24)
General design priciples	4.39	(0.07)	4.54	(0.17)
Surveying	3.51	(0.10)	3.67	(0.25)
Grading and drainage	4.21	(0.07)	4.05	(0.25)
Computer skills	4.09	(0.07)	4.06	(0.20)
Public speaking	3.83	(0.08)	3.63	(0.21)
Business writing	3.91	(0.07)	4.05	(0.22)
Multimedia presentations	3.27	(0.08)	3.62	(0.15)
Spanish	3.94	(0.09)	3.82	(0.26)

Table 6d. Education demographics.

	Highest education level of respondents											
	High school[z]		Associate's		Bachelor's		Master's		Doctorate		Other	
Topic options	Mean rating of responses											
Accounting	3.28	[y](0.15)	3.55	(0.19)	3.46	(0.11)	3.54	(0.27)	0.00	(0.0)	3.36	(0.28)
Business administration	3.69	(0.16)	3.47	(0.18)	3.54	(0.10)	3.62	(0.33)	0.00	(0.0)	3.09	(0.43)
Business law	2.84	(0.22)	2.94	(0.20)	2.96	(0.11)	3.05	(0.32)	0.00	(0.0)	3.00	(0.00)
Marketing	3.68	(0.15)	3.94	(0.13)	3.65	(0.10)	3.59	(0.31)	0.00	(0.0)	3.36	(0.28)
Developing a business plan	4.02	(0.17)	4.22	(0.14)	3.87	(0.10)	3.87	(0.38)	0.00	(0.0)	3.81	(0.64)
Finace	3.85	(0.21)	3.96	(0.20)	3.58	(0.09)	3.65	(0.27)	0.00	(0.0)	4.73	(0.23)
Estimating and bidding	4.42	(0.16)	4.43	(0.22)	4.56	(0.07)	4.60	(0.17)	0.00	(0.0)	5.00	(0.00)
Management (personnel)	4.51	(0.13)	4.70	(0.10)	4.48	(0.08)	4.74	(0.13)	0.00	(0.0)	4.36	(0.28)
Management (clientele)	4.35	(0.14)	4.68	(0.10)	4.35	(0.09)	4.93	(0.07)	0.00	(0.0)	4.64	(0.28)
Production management	4.09	(0.19)	4.18	(0.21)	4.19	(0.08)	4.46	(0.18)	0.00	(0.0)	3.45	(0.69)
Plant ID (trees/shrubs)	4.34	(0.16)	4.27	(0.18)	4.45	(0.08)	4.30	(0.30)	0.00	(0.0)	4.28	(0.56)
Plant ID (perennial/annual)	4.33	(0.15)	4.09	(0.18)	4.29	(0.09)	4.30	(0.30)	0.00	(0.0)	3.91	(0.43)
Entomology	3.74	(0.16)	3.45	(0.15)	3.77	(0.11)	3.71	(0.28)	0.00	(0.0)	3.28	(0.23)
Irrigation	3.61	(0.20)	3.13	(0.12)	3.81	(0.10)	4.07	(0.26)	0.00	(0.0)	3.64	(0.28)
Plant establishment/maintenance	4.02	(0.15)	3.93	(0.20)	4.30	(0.08)	4.35	(0.19)	0.00	(0.0)	4.28	(0.56)
Plant biology	3.21	(0.15)	3.09	(0.18)	3.42	(0.10)	3.20	(0.20)	0.00	(0.0)	3.28	(0.23)
Plant physiology	3.20	(0.14)	3.11	(0.21)	3.42	(0.10)	3.19	(0.17)	0.00	(0.0)	3.28	(0.23)
Turfgrass management	3.73	(0.17)	3.45	(0.19)	3.82	(0.09)	4.19	(0.27)	0.00	(0.0)	3.64	(0.28)

[z] Highest educational degree completed.

[y] Standard error.

Table 6d. (continued)

	High school[z]		Associate's		Bachelor's		Master's		Doctorate		Other	
Introduction to soils	3.45	(0.13)	3.25	(0.16)	3.72	(0.10)	3.62	(0.23)	0.00	(0.0)	3.64	(0.28)
Plant pathology	3.56	(0.14)	3.39	(0.15)	3.89	(0.10)	3.84	(0.28)	0.00	(0.0)	3.28	(0.23)
Arboriculture	3.42	(0.23)	3.15	(0.16)	3.70	(0.09)	3.78	(0.26)	0.00	(0.0)	3.64	(0.28)
Plant propagation	2.49	(0.17)	2.80	(0.20)	2.84	(0.12)	2.41	(0.22)	0.00	(0.0)	2.64	(0.28)
Desiging residential	4.28	(0.14)	4.10	(0.21)	3.96	(0.11)	4.03	(0.23)	0.00	(0.0)	3.55	(0.47)
Designing commercial	3.74	(0.21)	4.05	(0.19)	3.72	(0.09)	3.83	(0.23)	0.00	(0.0)	3.28	(0.23)
General design priciples	4.61	(0.12)	4.26	(0.15)	4.43	(0.08)	4.41	(0.26)	0.00	(0.0)	3.55	(0.47)
Surveying	3.57	(0.19)	3.41	(0.23)	3.61	(0.12)	3.36	(0.27)	0.00	(0.0)	3.00	(0.00)
Grading and drainage	4.34	(0.13)	3.85	(0.19)	4.25	(0.09)	4.33	(0.23)	0.00	(0.0)	3.64	(0.28)
Computer skills	3.96	(0.17)	3.84	(0.15)	4.22	(0.09)	3.95	(0.24)	0.00	(0.0)	4.00	(0.00)
Public speaking	3.84	(0.18)	3.88	(0.14)	3.85	(0.10)	3.38	(0.28)	0.00	(0.0)	3.36	(0.28)
Business writing	3.80	(0.15)	3.74	(0.15)	3.99	(0.09)	4.26	(0.22)	0.00	(0.0)	3.64	(0.28)
Multimedia presentations	3.08	(0.21)	3.25	(0.14)	3.42	(0.10)	3.36	(0.28)	0.00	(0.0)	3.09	(0.43)
Spanish	3.70	(0.23)	3.53	(0.21)	4.09	(0.11)	4.14	(0.29)	0.00	(0.0)	3.81	(0.64)

Table 6e. Job position demographics.

	Position of respondents											
	Sole owner[z]		Partner[y]		Pres. / v.p.[x]		Manager[w]		Supervisor[v]		Sales[u]		Other[t]	
Topic options	Mean rating of responses											
Accounting	3.44	[s](0.12)	3.57	(0.27)	3.57	(0.14)	3.26	(0.19)	3.00	(0.00)	3.44	(0.34)	3.00	(0.00)
Business administration	3.61	(0.12)	3.56	(0.27)	3.67	(0.14)	3.07	(0.19)	3.00	(0.00)	4.00	(0.00)	3.35	(0.27)
Business law	2.97	(0.14)	2.75	(0.25)	3.11	(0.16)	2.88	(0.18)	2.30	(0.25)	2.56	(0.34)	3.00	(0.00)
Marketing	3.73	(0.11)	3.82	(0.19)	3.77	(0.14)	3.42	(0.22)	3.38	(0.28)	3.56	(0.34)	3.35	(0.27)
Developing a business plan	3.92	(0.13)	4.26	(0.22)	3.98	(0.13)	3.49	(0.25)	4.30	(0.25)	4.00	(0.00)	4.35	(0.27)
Finace	3.70	(0.13)	4.18	(0.20)	3.72	(0.14)	3.57	(0.18)	3.33	(0.26)	3.56	(0.34)	2.71	(0.24)
Estimating and bidding	4.56	(0.11)	4.69	(0.11)	4.50	(0.11)	4.33	(0.17)	4.38	(0.28)	5.00	(0.00)	4.65	(0.27)
Management (personnel)	4.49	(0.09)	4.60	(0.17)	4.70	(0.09)	4.29	(0.16)	4.08	(0.46)	5.00	(0.00)	4.71	(0.24)
Management (clientele)	4.37	(0.09)	4.53	(0.17)	4.62	(0.10)	4.14	(0.22)	4.70	(0.25)	4.44	(0.34)	4.71	(0.24)
Production management	4.21	(0.09)	4.50	(0.15)	4.21	(0.14)	3.54	(0.25)	3.62	(0.28)	5.00	(0.00)	4.71	(0.24)
Plant ID (trees/shrubs)	4.37	(0.10)	4.63	(0.14)	4.25	(0.14)	4.53	(0.14)	4.35	(0.52)	3.88	(0.68)	4.65	(0.27)
Plant ID (perennial/annual)	4.09	(0.11)	4.57	(0.14)	4.22	(0.14)	4.53	(0.14)	4.35	(0.52)	3.88	(0.68)	4.65	(0.27)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[s] Standard error.

Table 6e. (continued)

	Sole owner[z]		Partner[y]		Pres. / v.p.[x]		Manager[w]		Supervisor[v]		Sales[u]		Other[t]	
Entomology	3.60	(0.12)	3.89	(0.16)	3.66	(0.13)	3.88	(0.19)	4.03	(0.78)	3.44	(0.34)	3.29	(0.55)
Irrigation	3.68	(0.11)	3.57	(0.20)	3.57	(0.13)	4.12	(0.22)	3.73	(0.72)	3.44	(0.34)	3.65	(0.27)
Plant establishment/maintenance	4.07	(0.12)	4.36	(0.15)	4.11	(0.12)	4.64	(0.11)	4.30	(0.25)	3.88	(0.68)	4.29	(0.55)
Plant biology	3.24	(0.12)	3.22	(0.14)	3.13	(0.11)	3.84	(0.23)	3.97	(0.42)	3.44	(0.34)	4.00	(0.49)
Plant physiology	3.26	(0.12)	3.17	(0.13)	3.15	(0.12)	3.77	(0.27)	3.97	(0.42)	3.44	(0.34)	4.00	(0.49)
Turfgrass management	3.78	(0.11)	3.96	(0.19)	3.66	(0.13)	3.86	(0.26)	3.68	(0.26)	3.44	(0.34)	3.65	(0.74)
Introduction to soils	3.61	(0.10)	3.89	(0.20)	3.40	(0.12)	3.58	(0.30)	3.68	(0.26)	3.88	(0.68)	3.71	(0.55)
Plant pathology	3.65	(0.11)	3.85	(0.17)	3.69	(0.14)	3.94	(0.21)	4.03	(0.78)	3.44	(0.34)	4.00	(0.49)
Arboriculture	3.64	(0.10)	3.41	(0.20)	3.49	(0.14)	3.68	(0.27)	4.03	(0.78)	3.44	(0.34)	3.29	(0.55)
Plant propagation	2.59	(0.12)	2.82	(0.22)	2.70	(0.14)	3.03	(0.34)	2.94	(0.85)	3.44	(0.34)	3.35	(0.27)
Desiging residential	3.90	(0.12)	4.65	(0.14)	4.05	(0.14)	3.79	(0.33)	3.68	(0.26)	4.00	(0.00)	4.29	(0.24)
Designing commercial	3.53	(0.11)	4.46	(0.15)	3.70	(0.14)	4.01	(0.22)	3.97	(0.42)	3.56	(0.34)	3.94	(0.44)
General design priciples	4.29	(0.10)	4.84	(0.08)	4.39	(0.12)	4.47	(0.19)	3.97	(0.42)	4.00	(0.00)	4.35	(0.27)
Surveying	3.43	(0.14)	4.14	(0.21)	3.47	(0.15)	3.42	(0.33)	2.62	(0.28)	3.88	(0.68)	3.65	(0.27)
Grading and drainage	4.22	(0.11)	4.49	(0.14)	4.04	(0.12)	3.95	(0.28)	4.05	(0.48)	4.44	(0.34)	4.65	(0.27)
Computer skills	4.16	(0.09)	3.98	(0.19)	4.06	(0.12)	4.12	(0.17)	3.43	(0.74)	4.44	(0.34)	4.00	(0.49)
Public speaking	3.85	(0.11)	3.90	(0.18)	3.73	(0.13)	3.60	(0.21)	3.38	(0.28)	4.44	(0.34)	4.35	(0.27)
Business writing	4.05	(0.10)	3.92	(0.18)	3.90	(0.13)	3.68	(0.19)	3.00	(0.00)	4.00	(0.00)	4.29	(0.55)
Multimedia presentations	3.34	(0.10)	3.40	(0.21)	3.32	(0.14)	3.22	(0.27)	2.30	(0.25)	3.44	(0.34)	4.00	(0.49)
Spanish	3.98	(0.14)	4.01	(0.27)	3.89	(0.15)	3.85	(0.20)	2.94	(0.85)	3.44	(0.34)	4.71	(0.24)

Table 7. Responses of Associated Landscape Contractors of America industry members when asked to rate[z] the importance of skills used by individuals in the landscape contracting industry. Response options are ranked in descending order using the overall mean.

	Annual revenue[y] (thousands of U.S. dollars)									
	Overall		< 250		250 - 750		750 - 2,000		> 2,000	
Skill options	Mean rating of responses									
Good work ethic	4.84	[x](n=137)	4.81	(n=32)	4.86	(n=28)	4.81	(n=42)	4.89	(n=35)
Proper attitude / personality	4.78	(n=137)	4.81	(n=32)	4.71	(n=28)	4.76	(n=42)	4.83	(n=35)
Client relationships	4.63	(n=131)	4.56	(n=27)	4.57	(n=28)	4.64	(n=42)	4.74	(n=34)
Time management	4.57	(n=131)	4.48	(n=27)	4.64	(n=28)	4.50	(n=42)	4.65	(n=34)
Managing employees	4.48	(n=130)	4.46	(n=26)	4.32	(n=28)	4.52	(n=42)	4.62	(n=34)
Plant identification	4.46	(n=137)	4.38	(n=32)	4.39	(n=28)	4.67	(n=42)	4.40	(n=35)
Organizational skills	4.39	(n=137)	4.34	(n=32)	4.36	(n=28)	4.33	(n=42)	4.54	(n=35)
Proper planting techniques	4.31	(n=127)	4.33	(n=27)	4.41	(n=27)	4.35	(n=40)	4.15	(n=33)
Production management	4.31	(n=131)	4.19	(n=27)	4.32	(n=28)	4.33	(n=42)	4.38	(n=34)
Internships or work experience	4.30	(n=137)	4.13	(n=32)	4.32	(n=28)	4.36	(n=42)	4.43	(n=35)
Understanding budgets	4.22	(n=131)	4.11	(n=27)	4.25	(n=28)	4.24	(n=42)	4.27	(n=34)
Pruning techniques	4.20	(n=137)	4.13	(n=32)	4.29	(n=28)	4.36	(n=42)	4.06	(n=35)
Ability to speak professionally	4.14	(n=131)	4.19	(n=27)	4.07	(n=28)	4.07	(n=42)	4.24	(n=34)
Proper watering techniques	4.12	(n=137)	4.03	(n=32)	4.07	(n=28)	4.21	(n=42)	4.17	(n=35)
Ability to write professionally	4.10	(n=131)	4.11	(n=27)	4.00	(n=28)	4.00	(n=42)	4.27	(n=34)
Conflict management	4.04	(n=131)	4.04	(n=27)	4.04	(n=28)	3.81	(n=42)	4.29	(n=34)

[z] Rating scale: (1) not important, (2) below average importance, (3) average importance, (4) above average importance, and (5) very important.

[y] Gross annual revenue.

[x] Total number of responses per category.

Table 7. (continued)

	Overall		< 250		250 - 750		750 - 2,000		> 2,000	
Fertilization techniques	3.95	(n=137)	3.94	(n=32)	4.11	(n=28)	3.91	(n=42)	3.86	(n=35)
Large equipment operation	3.91	(n=126)	4.00	(n=27)	4.04	(n=27)	3.75	(n=40)	3.84	(n=32)
Insect identification	3.88	(n=137)	3.84	(n=32)	3.93	(n=28)	3.86	(n=42)	3.91	(n=35)
Disease identification	3.88	(n=137)	3.88	(n=32)	3.89	(n=28)	3.81	(n=42)	3.94	(n=35)
Pesticide application / license	3.87	(n=137)	3.84	(n=32)	3.86	(n=28)	3.74	(n=42)	4.06	(n=35)
Grading techniques	3.86	(n=125)	3.67	(n=27)	3.82	(n=27)	4.13	(n=40)	3.84	(n=31)
Understanding plant growth	3.85	(n=137)	3.75	(n=32)	4.00	(n=28)	3.81	(n=42)	3.89	(n=35)
Bilingual in Spanish	3.84	(n=137)	3.53	(n=32)	3.86	(n=28)	3.94	(n=42)	4.09	(n=35)
Small equipment operation	3.83	(n=126)	3.78	(n=27)	3.96	(n=27)	3.73	(n=40)	3.88	(n=32)
Use of Microsoft Word, Excel	3.71	(n=137)	3.72	(n=32)	3.57	(n=28)	3.60	(n=42)	3.94	(n=35)
Irrigation troubleshooting	3.69	(n=137)	4.03	(n=32)	3.57	(n=28)	3.58	(n=42)	3.49	(n=35)
Hand drafting techniques	3.68	(n=126)	3.70	(n=27)	3.59	(n=27)	3.63	(n=40)	3.78	(n=32)
Using a transit	3.67	(n=124)	3.56	(n=27)	3.56	(n=27)	3.88	(n=40)	3.70	(n=30)
Computer drafting (AutoCAD)	3.64	(n=126)	3.70	(n=27)	3.52	(n=27)	3.65	(n=40)	3.69	(n=32)
Identifying abiotic stresses	3.64	(n=137)	3.63	(n=32)	3.71	(n=28)	3.68	(n=42)	3.54	(n=35)
Accounts payable / receivable	3.60	(n=131)	3.45	(n=27)	3.71	(n=28)	3.69	(n=42)	3.56	(n=34)
Use of email / Internet	3.59	(n=137)	3.56	(n=32)	3.64	(n=28)	3.41	(n=42)	3.77	(n=35)
Small wall installation	3.58	(n=125)	3.52	(n=27)	3.67	(n=27)	3.61	(n=40)	3.52	(n=31)
Irrigation repairs	3.52	(n=136)	3.78	(n=32)	3.43	(n=28)	3.54	(n=42)	3.27	(n=34)
Paver installation	3.52	(n=125)	3.52	(n=27)	3.56	(n=27)	3.51	(n=40)	3.48	(n=31)
Soil test interpretation	3.51	(n=137)	3.56	(n=32)	3.68	(n=28)	3.52	(n=42)	3.29	(n=35)
Marketing techniques	3.49	(n=131)	3.78	(n=27)	3.64	(n=28)	3.41	(n=42)	3.15	(n=34)
Member of associations	3.47	(n=137)	3.41	(n=32)	3.61	(n=28)	3.38	(n=42)	3.51	(n=35)
Understanding law of business	3.35	(n=131)	3.45	(n=27)	3.46	(n=28)	3.45	(n=42)	3.06	(n=34)
Pond installation	3.28	(n=125)	3.38	(n=27)	3.26	(n=27)	3.44	(n=40)	3.03	(n=31)
Advertising techniques	3.21	(n=131)	3.56	(n=27)	3.46	(n=28)	3.02	(n=42)	2.82	(n=34)
Ability to ball and burlap trees	2.84	(n=124)	2.78	(n=27)	2.89	(n=27)	2.86	(n=40)	2.83	(n=30)

Table 7a. Region demographics.

	Region of respondents											
	Mid-Atlantic[z]		New England[y]		Midwest[x]		South[w]		Southwest[v]		West[u]	
Skill options	Mean rating of responses											
Managing employees	4.61	[t](0.11)	4.68	(0.18)	4.54	(0.09)	4.38	(0.13)	4.33	(0.17)	4.42	(0.18)
Client relationships	4.64	(0.10)	4.83	(0.15)	4.67	(0.09)	4.47	(0.10)	4.78	(0.11)	4.63	(0.14)
Understanding budgets	4.28	(0.15)	4.13	(0.27)	4.25	(0.12)	4.13	(0.14)	4.48	(0.14)	4.08	(0.19)
Understanding law of business	3.59	(0.18)	3.33	(0.36)	3.16	(0.13)	3.27	(0.15)	3.58	(0.22)	3.43	(0.21)
Accounts payable/receivable	3.92	(0.14)	3.84	(0.25)	3.50	(0.15)	3.43	(0.16)	3.47	(0.16)	3.69	(0.23)
Advertising techniques	3.34	(0.18)	3.05	(0.27)	3.17	(0.14)	3.21	(0.16)	3.26	(0.19)	3.17	(0.20)
Marketing techniques	3.44	(0.17)	3.61	(0.30)	3.50	(0.14)	3.45	(0.16)	3.63	(0.18)	3.47	(0.19)
Time management	4.77	(0.08)	4.56	(0.19)	4.62	(0.08)	4.51	(0.10)	4.50	(0.19)	4.36	(0.18)
Production management	4.61	(0.10)	4.17	(0.24)	4.16	(0.12)	4.40	(0.13)	4.42	(0.19)	4.03	(0.25)
Ability to speak professionally	4.14	(0.17)	4.51	(0.30)	4.11	(0.13)	4.21	(0.14)	4.09	(0.20)	3.98	(0.22)
Ability to write professionally	3.98	(0.18)	4.12	(0.33)	4.17	(0.12)	4.16	(0.13)	4.36	(0.17)	3.80	(0.20)
Conflict management	4.13	(0.15)	4.01	(0.35)	4.08	(0.13)	3.91	(0.13)	3.98	(0.21)	4.17	(0.22)
Hand drafting techniques	3.89	(0.20)	3.37	(0.32)	3.63	(0.15)	3.77	(0.15)	3.50	(0.14)	3.57	(0.25)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Standard error.

Table 7a. (continued)

	Mid-Atlantic[z]		New England[y]		Midwest[x]		South[w]		Southwest[v]		West[u]	
Computer drafting (AutoCAD)	4.01	(0.16)	3.69	(0.47)	3.67	(0.14)	3.45	(0.17)	3.67	(0.25)	3.43	(0.15)
Paver Installation	4.03	(0.14)	3.05	(0.27)	3.67	(0.13)	3.31	(0.11)	3.32	(0.13)	3.26	(0.13)
Small Wall Installation	4.06	(0.12)	3.05	(0.27)	3.69	(0.13)	3.50	(0.11)	3.32	(0.13)	3.24	(0.12)
Pond Installation	3.80	(0.14)	2.91	(0.24)	3.28	(0.15)	3.00	(0.16)	3.05	(0.19)	3.41	(0.20)
Ability to Ball & Burlap Trees	3.33	(0.16)	3.34	(0.28)	2.79	(0.13)	2.74	(0.17)	2.75	(0.26)	2.33	(0.20)
Proper Planting Techniques	4.49	(0.10)	4.56	(0.26)	4.28	(0.12)	4.26	(0.12)	3.84	(0.24)	4.42	(0.21)
Using a Transit	4.02	(0.14)	3.84	(0.43)	3.68	(0.16)	3.49	(0.16)	3.53	(0.20)	3.55	(0.26)
Grading Techniques	3.95	(0.14)	4.13	(0.33)	3.92	(0.12)	3.78	(0.16)	3.70	(0.23)	3.79	(0.24)
Small Equipment Operation	4.00	(0.17)	3.89	(0.32)	3.85	(0.14)	3.68	(0.13)	3.71	(0.31)	3.91	(0.24)
Large Equipment Operation	4.00	(0.17)	4.04	(0.35)	3.94	(0.13)	3.84	(0.14)	3.80	(0.31)	3.85	(0.22)
Plant Identification	4.57	(0.12)	4.44	(0.26)	4.41	(0.11)	4.60	(0.11)	4.11	(0.16)	4.43	(0.20)
Insect Identification	3.68	(0.17)	4.13	(0.27)	3.91	(0.13)	3.99	(0.14)	3.71	(0.19)	3.90	(0.21)
Disease Identification	3.78	(0.16)	4.02	(0.30)	3.84	(0.11)	4.01	(0.14)	3.75	(0.21)	3.90	(0.17)
Pruning Techniques	4.36	(0.13)	4.24	(0.25)	4.21	(0.13)	4.13	(0.16)	4.01	(0.18)	4.22	(0.19)
Fertilization Techniques	4.02	(0.16)	4.02	(0.25)	3.74	(0.13)	4.10	(0.17)	3.85	(0.21)	4.05	(0.19)
Irrigation Troubleshooting	3.55	(0.18)	3.87	(0.28)	3.51	(0.13)	3.70	(0.14)	3.86	(0.18)	3.98	(0.29)
Irrigation Repairs	3.51	(0.18)	3.75	(0.34)	3.33	(0.14)	3.38	(0.17)	3.64	(0.25)	3.95	(0.28)
Proper Watering Techniques	4.05	(0.16)	4.47	(0.27)	4.11	(0.13)	4.04	(0.17)	4.04	(0.16)	4.27	(0.17)
Soil Test Interpretation	3.62	(0.17)	4.10	(0.28)	3.30	(0.13)	3.57	(0.13)	3.46	(0.20)	3.48	(0.27)
Understanding Plant Growth	4.06	(0.17)	4.47	(0.27)	3.60	(0.11)	3.81	(0.12)	3.91	(0.19)	3.87	(0.19)
Pesticide Application/License	3.77	(0.16)	3.96	(0.24)	3.91	(0.15)	4.03	(0.15)	3.66	(0.23)	3.77	(0.20)
Identifying Abiotic Stresses	3.70	(0.15)	3.88	(0.36)	3.57	(0.15)	3.75	(0.15)	3.43	(0.22)	3.55	(0.22)
Internships or Work Experience	4.33	(0.14)	4.45	(0.26)	4.44	(0.12)	4.17	(0.14)	4.16	(0.13)	4.25	(0.18)
Organizational Skills	4.45	(0.11)	4.50	(0.17)	4.40	(0.09)	4.34	(0.09)	4.39	(0.21)	4.35	(0.13)
Use of Email / Internet	3.95	(0.15)	3.52	(0.17)	3.43	(0.14)	3.55	(0.14)	3.74	(0.28)	3.48	(0.18)

Table 7a. (continued)

	Mid-Atlantic[z]		New England[y]		Midwest[x]		South[w]		Southwest[v]		West[u]	
Use of Microsoft Word, Excel	3.98	(0.16)	3.58	(0.23)	3.61	(0.14)	3.64	(0.14)	3.89	(0.25)	3.66	(0.17)
Bilingual in Spanish	4.12	(0.15)	4.25	(0.23)	3.64	(0.15)	3.77	(0.17)	3.95	(0.18)	3.78	(0.25)
Member of Associations	3.60	(0.15)	3.39	(0.23)	3.42	(0.16)	3.40	(0.17)	3.53	(0.24)	3.55	(0.24)
Proper Attitude / Personality	4.92	(0.05)	5.00	(0.00)	4.81	(0.07)	4.75	(0.08)	4.64	(0.13)	4.63	(0.13)
Good Work Ethic	4.92	(0.05)	5.00	(0.00)	4.87	(0.06)	4.80	(0.08)	4.71	(0.12)	4.79	(0.09)

Table 7b. Age demographics.

	Age of respondents											
	< 30[z]		30 to 39		40 to 49		50 to 59		60 to 69		> 70	
Skill options	Mean rating of responses											
Managing employees	4.56	[y](0.14)	4.46	(0.13)	4.45	(0.09)	4.54	(0.12)	4.30	(0.25)	0.00	(0.00)
Client relationships	4.56	(0.12)	4.65	(0.09)	4.66	(0.08)	4.60	(0.11)	4.70	(0.25)	0.00	(0.00)
Understanding budgets	4.36	(0.17)	4.23	(0.14)	4.25	(0.10)	4.09	(0.14)	3.70	(0.25)	0.00	(0.00)
Understanding law of business	3.33	(0.24)	3.42	(0.16)	3.35	(0.11)	3.30	(0.14)	3.40	(0.28)	0.00	(0.00)
Accounts payable/receivable	3.62	(0.17)	3.82	(0.13)	3.68	(0.12)	3.18	(0.17)	3.60	(0.50)	0.00	(0.00)
Advertising techniques	3.17	(0.18)	3.26	(0.15)	3.17	(0.12)	3.30	(0.17)	3.00	(0.00)	0.00	(0.00)
Marketing techniques	3.39	(0.18)	3.67	(0.15)	3.37	(0.11)	3.63	(0.18)	3.30	(0.25)	0.00	(0.00)
Time management	4.66	(0.11)	4.69	(0.09)	4.52	(0.09)	4.47	(0.12)	4.60	(0.28)	0.00	(0.00)
Production management	4.26	(0.16)	4.42	(0.13)	4.36	(0.10)	4.14	(0.18)	4.00	(0.00)	0.00	(0.00)
Ability to speak professionally	4.45	(0.14)	4.16	(0.17)	4.06	(0.11)	4.01	(0.17)	4.70	(0.25)	0.00	(0.00)
Ability to write professionally	4.01	(0.16)	4.09	(0.16)	4.08	(0.11)	4.17	(0.15)	4.40	(0.50)	0.00	(0.00)
Conflict management	4.14	(0.16)	4.05	(0.15)	4.03	(0.10)	4.10	(0.16)	3.00	(0.00)	0.00	(0.00)
Hand drafting techniques	3.51	(0.26)	3.69	(0.17)	3.95	(0.10)	3.22	(0.16)	3.60	(0.50)	0.00	(0.00)
Computer drafting (AutoCAD)	3.88	(0.24)	3.60	(0.18)	3.63	(0.12)	3.59	(0.15)	3.30	(0.25)	0.00	(0.00)
Paver Installation	3.77	(0.18)	3.42	(0.15)	3.48	(0.10)	3.45	(0.12)	4.00	(0.41)	0.00	(0.00)
Small Wall Installation	3.77	(0.18)	3.55	(0.14)	3.56	(0.09)	3.45	(0.12)	4.00	(0.41)	0.00	(0.00)
Pond Installation	3.55	(0.20)	3.30	(0.16)	3.18	(0.13)	3.19	(0.13)	4.00	(0.41)	0.00	(0.00)
Ability to Ball & Burlap Trees	2.75	(0.18)	2.77	(0.16)	2.94	(0.14)	2.72	(0.13)	3.40	(0.28)	0.00	(0.00)
Proper Planting Techniques	4.45	(0.12)	4.21	(0.14)	4.42	(0.10)	4.05	(0.15)	4.70	(0.25)	0.00	(0.00)
Using a Transit	3.76	(0.21)	3.60	(0.17)	3.70	(0.12)	3.55	(0.19)	4.40	(0.50)	0.00	(0.00)

[z] Age categories in years.

[y] Standard error.

Table 7b. (continued)

	< 30[z]		30 to 39		40 to 49		50 to 59		60 to 69		> 70	
Grading Techniques	3.92	(0.17)	3.74	(0.17)	3.96	(0.11)	3.69	(0.17)	4.40	(0.50)	0.00	(0.00)
Small Equipment Operation	3.88	(0.23)	3.96	(0.15)	3.83	(0.12)	3.65	(0.18)	3.70	(0.25)	0.00	(0.00)
Large Equipment Operation	4.08	(0.23)	4.03	(0.15)	3.91	(0.11)	3.65	(0.17)	3.70	(0.25)	0.00	(0.00)
Plant Identification	4.53	(0.14)	4.36	(0.12)	4.54	(0.09)	4.33	(0.15)	4.70	(0.25)	0.00	(0.00)
Insect Identification	3.68	(0.18)	3.77	(0.17)	3.93	(0.11)	4.04	(0.13)	4.10	(0.47)	0.00	(0.00)
Disease Identification	3.77	(0.17)	3.78	(0.16)	3.94	(0.10)	3.93	(0.10)	4.10	(0.47)	0.00	(0.00)
Pruning Techniques	4.02	(0.21)	4.22	(0.12)	4.13	(0.12)	4.40	(0.12)	4.40	(0.28)	0.00	(0.00)
Fertilization Techniques	4.10	(0.20)	3.97	(0.15)	3.83	(0.12)	4.03	(0.14)	4.10	(0.47)	0.00	(0.00)
Irrigation Troubleshooting	3.60	(0.19)	3.82	(0.17)	3.62	(0.12)	3.75	(0.16)	3.40	(0.28)	0.00	(0.00)
Irrigation Repairs	3.47	(0.22)	3.69	(0.15)	3.50	(0.14)	3.49	(0.19)	2.70	(0.25)	0.00	(0.00)
Proper Watering Techniques	4.21	(0.17)	4.10	(0.11)	3.95	(0.12)	4.36	(0.16)	4.70	(0.25)	0.00	(0.00)
Soil Test Interpretation	3.31	(0.26)	3.43	(0.12)	3.43	(0.12)	3.83	(0.15)	4.10	(0.47)	0.00	(0.00)
Understanding Plant Growth	3.81	(0.20)	3.74	(0.12)	3.81	(0.10)	4.06	(0.14)	4.10	(0.47)	0.00	(0.00)
Pesticide Application/License	3.59	(0.22)	4.19	(0.14)	3.76	(0.12)	3.89	(0.14)	4.40	(0.50)	0.00	(0.00)
Identifying Abiotic Stresses	3.34	(0.19)	3.61	(0.17)	3.60	(0.12)	3.89	(0.14)	4.10	(0.47)	0.00	(0.00)
Internships or Work Experience	4.43	(0.17)	4.18	(0.13)	4.38	(0.09)	4.19	(0.15)	4.40	(0.50)	0.00	(0.00)
Organizational Skills	4.48	(0.14)	4.32	(0.10)	4.49	(0.07)	4.21	(0.12)	4.70	(0.25)	0.00	(0.00)
Use of Email / Internet	3.68	(0.26)	3.50	(0.15)	3.69	(0.10)	3.45	(0.15)	3.60	(0.50)	0.00	(0.00)
Use of Microsoft Word, Excel	3.63	(0.26)	3.69	(0.15)	3.78	(0.10)	3.68	(0.16)	3.60	(0.50)	0.00	(0.00)
Bilingual in Spanish	3.34	(0.21)	4.22	(0.16)	3.95	(0.10)	3.54	(0.17)	4.00	(0.41)	0.00	(0.00)
Member of Associations	3.26	(0.17)	3.82	(0.15)	3.50	(0.13)	3.17	(0.17)	3.60	(0.50)	0.00	(0.00)
Proper Attitude / Personality	4.74	(0.13)	4.85	(0.06)	4.77	(0.06)	4.75	(0.09)	5.00	(0.00)	0.00	(0.00)
Good Work Ethic	4.84	(0.08)	4.82	(0.07)	4.89	(0.04)	4.75	(0.09)	5.00	(0.00)	0.00	(0.00)

Table 7c. Gender demographics.

	Gender of respondents			
	Male		Female	
Skill options	Mean rating of responses			
Managing employees	4.47	[z](0.06)	4.58	(0.12)
Client relationships	4.60	(0.05)	4.84	(0.08)
Understanding budgets	4.19	(0.07)	4.40	(0.17)
Understanding law of business	3.32	(0.08)	3.60	(0.19)
Accounts payable/receivable	3.61	(0.08)	3.53	(0.20)
Advertising techniques	3.19	(0.08)	3.34	(0.23)
Marketing techniques	3.48	(0.07)	3.55	(0.23)
Time management	3.56	(0.06)	4.57	(0.12)
Production management	4.32	(0.07)	4.19	(0.24)
Ability to speak professionally	4.17	(0.08)	4.00	(0.23)
Ability to write professionally	4.09	(0.07)	4.16	(0.20)
Conflict management	4.01	(0.07)	4.28	(0.20)
Hand drafting techniques	3.67	(0.08)	3.70	(0.27)
Computer drafting (AutoCAD)	3.65	(0.09)	3.57	(0.17)
Paver Installation	3.50	(0.07)	3.61	(0.19)
Small Wall Installation	3.56	(0.07)	3.68	(0.18)
Pond Installation	3.30	(0.08)	3.13	(0.19)
Ability to Ball & Burlap Trees	2.79	(0.08)	3.19	(0.25)
Proper Planting Techniques	4.30	(0.07)	4.40	(0.16)
Using a Transit	3.69	(0.09)	3.50	(0.23)
Grading Techniques	3.89	(0.08)	3.62	(0.18)

[z] Standard error.

Table 7c. (continued)

	Male		Female	
Small Equipment Operation	3.84	(0.08)	3.77	(0.26)
Large Equipment Operation	3.93	(0.08)	3.77	(0.26)
Plant Identification	4.48	(0.06)	4.34	(0.17)
Insect Identification	3.84	(0.08)	4.19	(0.13)
Disease Identification	3.85	(0.07)	4.08	(0.14)
Pruning Techniques	4.20	(0.07)	4.20	(0.21)
Fertilization Techniques	3.96	(0.08)	3.89	(0.21)
Irrigation Troubleshooting	3.70	(0.08)	3.59	(0.23)
Irrigation Repairs	3.52	(0.09)	3.52	(0.24)
Proper Watering Techniques	4.09	(0.08)	4.33	(0.20)
Soil Test Interpretation	3.54	(0.08)	3.35	(0.22)
Understanding Plant Growth	3.81	(0.07)	4.14	(0.18)
Pesticide Application/License	3.84	(0.08)	4.09	(0.18)
Identifying Abiotic Stresses	3.58	(0.08)	3.98	(0.20)
Internships or Work Experience	4.31	(0.07)	4.27	(0.17)
Organizational Skills	4.37	(0.05)	4.54	(0.15)
Use of Email / Internet	3.62	(0.08)	3.41	(0.21)
Use of Microsoft Word, Excel	3.74	(0.08)	3.55	(0.19)
Bilingual in Spanish	3.88	(0.08)	3.62	(0.22)
Member of Associations	3.49	(0.09)	3.33	(0.20)
Proper Attitude / Personality	4.78	(0.04)	4.80	(0.09)
Good Work Ethic	4.85	(0.03)	7.80	(0.09)

Table 7d. Education demographics.

	Highest education level of respondents											
	High school[z]		Associate's		Bachelor's		Master's		Doctorate		Other	
Skill options	Mean rating of responses											
Managing employees	4.48	[y](0.12)	4.20	(0.15)	4.54	(0.08)	4.74	(0.13)	0.00	(0.00)	4.36	(0.28)
Client relationships	4.56	(0.11)	4.48	(0.11)	4.64	(0.07)	4.93	(0.07)	0.00	(0.00)	5.00	(0.00)
Understanding budgets	4.37	(0.13)	4.12	(0.20)	4.15	(0.08)	4.56	(0.18)	0.00	(0.00)	4.28	(0.23)
Understanding law of business	3.28	(0.17)	3.19	(0.18)	3.33	(0.10)	3.83	(0.29)	0.00	(0.00)	4.00	(0.00)
Accounts payable/receivable	3.77	(0.19)	3.39	(0.23)	3.60	(0.09)	3.71	(0.17)	0.00	(0.00)	3.73	(0.56)
Advertising techniques	3.19	(0.16)	3.38	(0.20)	3.18	(0.09)	3.15	(0.31)	0.00	(0.00)	3.00	(0.00)
Marketing techniques	3.51	(0.17)	3.51	(0.20)	3.17	(0.09)	3.68	(0.27)	0.00	(0.00)	3.00	(0.00)
Time management	4.76	(0.10)	4.74	(0.09)	4.47	(0.07)	4.44	(0.15)	0.00	(0.00)	4.64	(0.28)
Production management	4.44	(0.15)	4.22	(0.19)	4.34	(0.09)	4.28	(0.17)	0.00	(0.00)	3.36	(0.28)
Ability to speak professionally	4.14	(0.18)	4.20	(0.14)	4.15	(0.10)	4.23	(0.29)	0.00	(0.00)	3.19	(0.64)
Ability to write professionally	4.00	(0.17)	3.95	(0.15)	4.17	(0.09)	4.26	(0.25)	0.00	(0.00)	3.55	(0.47)
Conflict management	3.81	(0.14)	3.95	(0.16)	4.13	(0.10)	4.31	(0.17)	0.00	(0.00)	3.28	(0.23)
Hand drafting techniques	3.74	(0.22)	3.53	(0.20)	3.67	(0.11)	3.84	(0.17)	0.00	(0.00)	3.91	(0.43)
Computer drafting (AutoCAD)	3.47	(0.20)	3.35	(0.20)	3.78	(0.10)	3.73	(0.29)	0.00	(0.00)	3.64	(0.28)
Paver Installation	3.74	(0.18)	3.40	(0.13)	3.48	(0.09)	3.58	(0.16)	0.00	(0.00)	3.55	(0.47)
Small Wall Installation	3.83	(0.17)	3.35	(0.12)	3.56	(0.08)	3.72	(0.16)	0.00	(0.00)	3.55	(0.47)
Pond Installation	3.58	(0.21)	3.07	(0.17)	3.25	(0.10)	3.23	(0.14)	0.00	(0.00)	3.55	(0.47)
Ability to Ball & Burlap Trees	2.98	(0.23)	2.71	(0.13)	2.86	(0.11)	2.64	(0.34)	0.00	(0.00)	3.00	(0.00)
Proper Planting Techniques	4.48	(0.12)	3.89	(0.14)	4.36	(0.09)	4.59	(0.15)	0.00	(0.00)	4.28	(0.56)
Using a Transit	3.86	(0.21)	3.44	(0.14)	3.73	(0.11)	3.54	(0.22)	0.00	(0.00)	3.19	(0.64)
Grading Techniques	4.13	(0.17)	3.72	(0.15)	3.83	(0.10)	3.95	(0.25)	0.00	(0.00)	3.55	(0.47)

[z] Highest educational degree completed.

[y] Standard error.

Table 7d. (continued)

	High school[z]		Associate's		Bachelor's		Master's		Doctorate		Other	
Small Equipment Operation	3.83	(0.16)	3.61	(0.17)	3.87	(0.11)	4.14	(0.17)	0.00	(0.00)	3.55	(0.47)
Large Equipment Operation	4.16	(0.16)	3.72	(0.17)	3.87	(0.11)	4.17	(0.17)	0.00	(0.00)	3.55	(0.47)
Plant Identification	4.43	(0.13)	4.18	(0.15)	4.55	(0.07)	4.43	(0.31)	0.00	(0.00)	4.64	(0.28)
Insect Identification	3.88	(0.18)	3.68	(0.14)	3.95	(0.10)	3.80	(0.30)	0.00	(0.00)	4.00	(0.00)
Disease Identification	3.83	(0.19)	3.62	(0.14)	3.94	(0.09)	4.09	(0.22)	0.00	(0.00)	4.00	(0.00)
Pruning Techniques	4.35	(0.14)	3.64	(0.22)	4.27	(0.07)	4.57	(0.19)	0.00	(0.00)	4.28	(0.56)
Fertilization Techniques	4.14	(0.16)	3.53	(0.21)	3.95	(0.09)	4.47	(0.19)	0.00	(0.00)	3.91	(0.43)
Irrigation Troubleshooting	3.53	(0.23)	3.23	(0.19)	2.83	(0.09)	4.05	(0.28)	0.00	(0.00)	3.36	(0.28)
Irrigation Repairs	3.33	(0.22)	3.15	(0.22)	3.67	(0.10)	3.98	(0.27)	0.00	(0.00)	3.00	(0.00)
Proper Watering Techniques	4.19	(0.16)	3.83	(0.21)	4.22	(0.09)	4.33	(0.21)	0.00	(0.00)	3.28	(0.23)
Soil Test Interpretation	3.43	(0.17)	3.21	(0.19)	3.68	(0.09)	3.37	(0.32)	0.00	(0.00)	2.64	(0.28)
Understanding Plant Growth	3.68	(0.20)	3.62	(0.14)	3.95	(0.08)	4.16	(0.23)	0.00	(0.00)	3.28	(0.23)
Pesticide Application/License	3.80	(0.21)	3.57	(0.18)	3.99	(0.09)	3.98	(0.29)	0.00	(0.00)	3.36	(0.28)
Identifying Abiotic Stresses	3.64	(0.18)	3.49	(0.20)	3.65	(0.10)	4.02	(0.23)	0.00	(0.00)	3.00	(0.00)
Internships or Work Experience	4.40	(0.16)	3.91	(0.18)	4.37	(0.08)	4.43	(0.19)	0.00	(0.00)	4.28	(0.23)
Organizational Skills	4.38	(0.13)	4.24	(0.13)	4.42	(0.06)	4.53	(0.15)	0.00	(0.00)	4.64	(0.28)
Use of Email / Internet	3.58	(0.19)	3.34	(0.15)	3.71	(0.09)	3.39	(0.32)	0.00	(0.00)	3.36	(0.28)
Use of Microsoft Word, Excel	3.55	(0.19)	3.38	(0.14)	3.91	(0.09)	3.54	(0.30)	0.00	(0.00)	3.00	(0.00)
Bilingual in Spanish	3.71	(0.21)	3.48	(0.21)	4.00	(0.09)	3.89	(0.27)	0.00	(0.00)	3.36	(0.28)
Member of Associations	3.71	(0.21)	3.13	(0.17)	3.58	(0.10)	2.95	(0.29)	0.00	(0.00)	3.36	(0.28)
Proper Attitude / Personality	4.83	(0.09)	4.56	(0.12)	4.81	(0.05)	4.93	(0.07)	0.00	(0.00)	5.00	(0.00)
Good Work Ethic	4.78	(0.10)	4.69	(0.10)	4.88	(0.04)	4.93	(0.07)	0.00	(0.00)	5.00	(0.00)

Table 7e. Job position demographics.

	Position of respondents													
	Sole owner[z]		Partner[y]		Pres. / v.p.[x]		Manager[w]		Supervisor[v]		Sales[u]		Other[t]	
Skill options	Mean rating of responses													
Managing employees	4.42	[s](0.09)	4.55	(0.16)	4.58	(0.09)	4.36	(0.16)	4.35	(0.52)	4.44	(0.34)	4.71	(0.24)
Client relationships	4.64	(0.07)	4.53	(0.12)	4.70	(0.07)	4.52	(0.19)	4.68	(0.26)	4.44	(0.34)	4.71	(0.24)
Understanding budgets	4.19	(0.11)	4.36	(0.16)	4.21	(0.11)	4.08	(0.17)	3.68	(0.26)	5.00	(0.00)	4.65	(0.27)
Understanding law of business	3.38	(0.11)	3.40	(0.25)	3.38	(0.13)	3.10	(0.19)	2.59	(0.49)	4.00	(0.00)	4.00	(0.49)
Accounts payable/receivable	3.54	(0.14)	3.71	(0.19)	3.69	(0.12)	3.24	(0.21)	3.68	(0.26)	4.00	(0.00)	4.35	(0.27)
Advertising techniques	3.16	(0.11)	3.50	(0.19)	3.23	(0.15)	2.99	(0.21)	3.00	(0.00)	3.00	(0.00)	3.65	(0.27)
Marketing techniques	3.51	(0.12)	3.68	(0.18)	3.48	(0.13)	3.29	(0.25)	3.38	(0.28)	3.00	(0.00)	3.65	(0.27)
Time management	4.44	(0.09)	4.83	(0.09)	4.67	(0.08)	4.45	(0.19)	4.00	(0.00)	4.44	(0.34)	5.00	(0.00)
Production management	4.28	(0.09)	4.70	(0.14)	4.38	(0.12)	3.74	(0.27)	3.62	(0.28)	4.44	(0.34)	5.00	(0.00)
Ability to speak professionally	4.08	(0.12)	4.29	(0.20)	4.18	(0.13)	4.05	(0.20)	3.97	(0.42)	4.44	(0.34)	4.29	(0.55)
Ability to write professionally	4.21	(0.11)	3.91	(0.19)	4.06	(0.13)	4.10	(0.17)	3.59	(0.49)	4.00	(0.00)	4.29	(0.55)
Conflict management	3.80	(0.11)	4.35	(0.14)	4.10	(0.13)	4.25	(0.18)	4.05	(0.48)	4.44	(0.34)	4.35	(0.27)
Hand drafting techniques	3.62	(0.12)	4.23	(0.23)	3.51	(0.15)	3.58	(0.16)	3.65	(0.66)	3.88	(0.68)	3.59	(0.49)
Computer drafting (AutoCAD)	3.52	(0.13)	3.99	(0.17)	3.52	(0.16)	3.74	(0.17)	4.30	(0.25)	3.88	(0.68)	4.00	(0.49)
Paver Installation	3.56	(0.10)	3.84	(0.17)	3.20	(0.12)	3.50	(0.20)	3.68	(0.26)	4.44	(0.34)	3.94	(0.44)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[s] Standard error.

Table 7e. (continued)

	Sole owner[z]		Partner[y]		Pres. / v.p.[x]		Manager[w]		Supervisor[v]		Sales[u]		Other[t]	
Small Wall Installation	3.57	(0.09)	3.78	(0.18)	3.38	(0.11)	3.58	(0.16)	3.68	(0.26)	4.44	(0.34)	3.94	(0.44)
Pond Installation	3.28	(0.12)	3.29	(0.22)	3.17	(0.14)	3.20	(0.23)	3.38	(0.28)	4.44	(0.34)	3.94	(0.44)
Ability to Ball & Burlap Trees	2.84	(0.12)	2.68	(0.22)	2.84	(0.14)	2.82	(0.23)	2.94	(0.85)	3.00	(0.00)	3.65	(0.27)
Proper Planting Techniques	4.35	(0.09)	4.53	(0.13)	4.25	(0.13)	3.88	(0.23)	4.68	(0.26)	4.44	(0.34)	4.29	(0.24)
Using a Transit	3.73	(0.13)	3.84	(0.25)	3.57	(0.14)	3.47	(0.29)	3.00	(0.00)	3.88	(0.68)	4.29	(0.24)
Grading Techniques	3.92	(0.13)	3.88	(0.20)	3.76	(0.12)	3.73	(0.19)	3.76	(0.56)	4.44	(0.34)	4.29	(0.24)
Small Equipment Operation	3.82	(0.12)	3.98	(0.21)	3.75	(0.14)	4.07	(0.23)	3.05	(0.48)	3.88	(0.68)	4.00	(0.00)
Large Equipment Operation	3.97	(0.12)	4.13	(0.20)	3.75	(0.14)	3.83	(0.24)	3.97	(0.42)	3.88	(0.68)	3.65	(0.27)
Plant Identification	4.54	(0.09)	4.58	(0.12)	4.29	(0.12)	4.52	(0.15)	4.35	(0.52)	4.44	(0.34)	4.29	(0.24)
Insect Identification	3.75	(0.12)	4.27	(0.14)	3.91	(0.13)	3.92	(0.15)	4.03	(0.78)	3.44	(0.34)	3.65	(0.27)
Disease Identification	3.79	(0.11)	4.20	(0.16)	3.81	(0.12)	4.04	(0.12)	4.03	(0.78)	3.44	(0.34)	3.65	(0.27)
Pruning Techniques	4.27	(0.11)	4.18	(0.19)	4.15	(0.13)	4.21	(0.15)	3.65	(0.66)	3.88	(0.68)	4.65	(0.27)
Fertilization Techniques	4.00	(0.12)	4.05	(0.19)	3.85	(0.13)	3.98	(0.16)	3.65	(0.66)	3.88	(0.68)	4.00	(0.49)
Irrigation Troubleshooting	3.80	(0.12)	3.68	(0.22)	3.56	(0.14)	3.72	(0.23)	3.35	(0.52)	3.44	(0.34)	3.94	(0.44)
Irrigation Repairs	3.59	(0.14)	3.44	(0.22)	3.44	(0.15)	3.54	(0.24)	3.35	(0.52)	3.44	(0.34)	3.94	(0.44)
Proper Watering Techniques	3.99	(0.12)	4.23	(0.19)	4.20	(0.13)	4.24	(0.16)	3.38	(0.28)	4.44	(0.34)	4.65	(0.27)
Soil Test Interpretation	3.66	(0.12)	3.75	(0.20)	3.39	(0.13)	3.19	(0.21)	2.35	(0.52)	3.44	(0.34)	3.94	(0.44)
Understanding Plant Growth	3.80	(0.11)	3.96	(0.15)	3.78	(0.14)	4.05	(0.13)	3.62	(0.28)	3.88	(0.68)	4.29	(0.55)
Pesticide Application/License	4.03	(0.11)	4.00	(0.17)	3.55	(0.15)	4.07	(0.19)	3.35	(0.52)	4.00	(0.00)	4.00	(0.49)
Identifying Abiotic Stresses	3.71	(0.13)	3.77	(0.18)	3.47	(0.14)	3.70	(0.21)	3.35	(0.52)	3.44	(0.34)	4.00	(0.49)
Internships or Work Experience	4.31	(0.10)	4.63	(0.15)	4.24	(0.12)	4.17	(0.16)	3.68	(0.26)	3.88	(0.68)	4.65	(0.27)
Organizational Skills	4.37	(0.08)	4.58	(0.12)	4.44	(0.10)	4.28	(0.14)	3.68	(0.26)	4.44	(0.34)	4.35	(0.27)
Use of Email / Internet	3.64	(0.11)	3.77	(0.18)	3.49	(0.13)	3.52	(0.20)	2.97	(0.42)	3.88	(0.68)	4.00	(0.49)
Use of Microsoft Word, Excel	3.76	(0.11)	3.81	(0.18)	3.66	(0.14)	3.59	(0.22)	2.97	(0.42)	3.88	(0.68)	4.29	(0.55)
Bilingual in Spanish	3.78	(0.12)	3.97	(0.22)	3.83	(0.14)	3.93	(0.17)	3.32	(0.91)	3.44	(0.34)	4.71	(0.24)
Member of Associations	3.35	(0.11)	3.73	(0.24)	3.42	(0.18)	3.78	(0.19)	2.97	(0.42)	3.44	(0.34)	3.65	(0.27)
Proper Attitude / Personality	4.82	(0.05)	4.94	(0.06)	4.73	(0.08)	4.69	(0.11)	4.35	(0.52)	4.44	(0.34)	5.00	(0.00)
Good Work Ethic	4.87	(0.05)	4.93	(0.06)	4.82	(0.06)	4.75	(0.11)	4.68	(0.26)	4.44	(0.34)	5.00	(0.00)

Table 8. Responses of Associated Landscape Contractors of America industry members when asked: "What emphasis[z] should be placed on business training in an undergraduate landscape contracting (or similar) program?"

	Annual revenue[y] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Business training	Mean ratings of responses				
Average emphasis[z]	3.94	4.06	3.96	3.76	3.97
	[x](0.06)	(0.14)	(0.13)	(0.09)	(0.13)
	[w](n = 135)	(n_1 = 32)	(n_2 = 27)	(n_3 = 42)	(n_4 = 34)

[z] Rating scale: (1) no emphasis, (2) below moderate emphasis, (3) moderate emphasis, (4) above moderate emphasis, and (5) strong emphasis.

[y] Gross annual income.

[x] Standard error.

[w] Total number of respondents per category.

Table 8a. Region demographics.

	Region of respondents					
	Mid-Atlantic[z]	New England[y]	Midwest[x]	South[w]	Southwest[v]	West[u]
Business training	Percentage of responses					
Average empahsis[t]	3.98	3.68	3.66	4.15	4.29	3.98
	[s](0.13)	(0.26)	(0.13)	(0.12)	(0.13)	(0.15)
	[r](n=24)	(n=8)	(n=38)	(n=33)	(n=14)	(n=18)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Rating scale: (1) no emphasis, (2) below moderate emphasis, (3) moderate emphasis, (4) above moderate emphasis, and (5) strong emphasis.

[s] Standard error.

[r] Total number of respondents per category.

Table 8b. Age demographics.

	Age of respondents					
	< 30[z]	30 to 39	40 to 49	50 to 59	60 to 69	> 70
Business training	Percentage of responses					
Average empahsis[y]	3.95	4.05	4.01	3.73	3.60	0.00
	[x](0.16)	(0.12)	(0.09)	(0.16)	(0.28)	(0.0)
	[w](n=18)	(n=31)	(n=55)	(n=28)	(n=3)	(n=0)

[z] Age categories in years.

[y] Rating scale: (1) no emphasis, (2) below moderate emphasis, (3) moderate emphasis, (4) above moderate emphasis, and (5) strong emphasis.

[x] Standard error.

[w] Total number of respondents per category.

Table 8c. Gender demographics.

	Gender of respondents	
	Male	Female
Business training	Percentage of responses	
Average empahsis[z]	3.92	4.07
	[y](0.07)	(0.19)
	[x](n=118)	(n=17)

[z] Rating scale: (1) no emphasis, (2) below moderate emphasis, (3) moderate emphasis, (4) above moderate emphasis, and (5) strong emphasis.

[y] Standard error.

[x] Total number of respondents per category.

Table 8d. Education demographics.

	Highest education level of respondents					
	High school[z]	Associate's	Bachelor's	Master's	Doctorate	Other
Business training	Percentage of responses					
Average empahsis[y]	3.86	4.02	3.92	4.27	0.00	3.36
	[x](0.12)	(0.17)	(0.08)	(0.25)	(0.0)	(0.28)
	[w](n=22)	(n=20)	(n=79)	(n=11)	(n=0)	(n=3)

[z] Age categories in years.

[y] Rating scale: (1) no emphasis, (2) below moderate emphasis, (3) moderate emphasis, (4) above moderate emphasis, and (5) strong emphasis.

[x] Standard error.

[w] Total number of respondents per category.

Table 8e. Job position demographics.

	Position of respondents						
	Sole owner[z]	Partner[y]	Pres. or v.p.[x]	Manager[w]	Supervisor[v]	Sales/recruit.[u]	Other[t]
Business training	Percentage of responses						
Average empahsis[s]	3.99	3.95	3.97	3.79	3.68	3.88	4.00
	[r](0.09)	(0.20)	(0.12)	(0.17)	(0.26)	(0.68)	(0.49)
	[q](n=54)	(n=17)	(n=40)	(n=16)	(n=3)	(n=2)	(n=3)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[s] Rating scale: (1) no emphasis, (2) below moderate emphasis, (3) moderate emphasis, (4) above moderate emphasis, and (5) strong emphasis.

[r] Standard error.

[q] Total number of respondents per category.

Table 9. Responses of Associated Landscape Contractors of America industry members when asked: "When recruiting, what type of schools do you recruit from?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
School types	Percentage of responses				
Four-year [y]	12.2	12.5	11.1	4.8	20.0
	[x](2.8)	(5.8)	(6.0)	(3.2)	(6.6)
Two-year [w]	11.4	18.8	7.4	11.9	5.7
	(2.7)	(6.8)	(5.0)	(4.8)	(3.8)
Both [v]	43.9	28.1	33.3	52.4	62.9
	(4.0)	(7.9)	(9.0)	(7.5)	(8.0)
Neither [u]	32.5	40.6	48.2	31.0	11.4
	(3.9)	(8.6)	(9.5)	(6.9)	(5.3)
	[t](n = 136)	(n_1 = 32)	(n_2 = 27)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Universities or colleges offering four-year bachelor degrees.

[x] Standard error.

[w] Colleges or Technical schools offering two-year associate degrees.

[v] Both four-year and two-year degree programs.

[u] Do not recruit from colleges or universities.

[t] Total number of respondents per category.

Table 9a. Region demographics.

	Region of respondents					
	Mid-Atlantic[z]	New England[y]	Midwest[x]	South[w]	Southwest[v]	West[u]
School types	Percentage of responses					
Four-year[t]	13.1	0.0	13.6	6.8	15.9	20.1
	[s](6.9)	(0.0)	(5.5)	(4.5)	(10.1)	(8.8)
Two-year[r]	3.5	11.4	18.9	7.6	14.7	9.8
	(3.3)	(10.5)	(6.3)	(5.0)	(9.5)	(6.5)
Both[q]	64.7	35.5	43.0	44.3	42.0	25.2
	(9.8)	(16.6)	(7.8)	(8.3)	(12.7)	(9.6)
Neither[p]	18.8	53.1	24.6	41.4	27.5	44.9
	(8.2)	(17.4)	(6.7)	(8.5)	(11.7)	(11.2)
	[o](n=24)	(n=8)	(n=39)	(n=32)	(n=14)	(n=19)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Universities or colleges offering four-year bachelor degrees.

[s] Standard error.

[r] Colleges or Technical schools offering two-year associate degrees.

[q] Both four-year and two-year degree programs.

[p] Do not recruit from colleges or universities.

[o] Total number of respondents per category.

Table 9b. Age demographics.

	Age of respondents					
	< 30[z]	30 to 39	40 to 49	50 to 59	60 to 69	> 70
School types	Percentage of responses					
Four-year[y]	23.3	5.7	16.8	3.8	0.0	0.0
	[x](10.0)	(3.8)	(5.0)	(3.6)	(0.0)	(0.0)
Two-year[w]	10.6	15.3	6.6	18.1	0.0	0.0
	(7.1)	(6.7)	(3.2)	(7.3)	(0.0)	(0.0)
Both[v]	44.7	39.5	43.3	44.2	100.0	0.0
	(11.5)	(8.4)	(6.4)	(9.2)	(0.0)	(0.0)
Neither[u]	21.5	39.5	33.3	34.0	0.0	0.0
	(9.4)	(8.6)	(6.1)	(9.0)	(0.0)	(0.0)
	[t](n=18)	(n=31)	(n=56)	(n=28)	(n3)	(n=0)

[z] Age categories in years.

[y] Universities or colleges offering four-year bachelor degrees.

[x] Standard error.

[w] Colleges or Technical schools offering two-year associate degrees.

[v] Both four-year and two-year degree programs.

[u] Do not recruit from colleges or universities.

[t] Total number of respondents per category.

Table 9c. Gender demographics.

	Gender of respondents	
	Male	Female
School types	Percentage of responses	
Four-year[z]	11.4	17.0
	[y](2.9)	(8.8)
Two-year[x]	13.2	0.0
	(3.1)	(0.0)
Both[w]	44.9	37.8
	(4.4)	(10.8)
Neither[v]	30.5	45.2
	(4.2)	(11.1)
	[u](n=118)	(n=18)

[z] Universities or colleges offering four-year bachelor degrees.

[y] Standard error.

[x] Colleges or Technical schools offering two-year associate degrees.

[w] Both four-year and two-year degree programs.

[v] Do not recruit from colleges or universities.

[u] Total number of respondents per category.

Table 9d. Education demographics.

	Highest education level of respondents					
	High school[z]	Associate's	Bachelor's	Master's	Doctorate	Other
School types	Percentage of responses					
Four-year[y]	0.0	13.2	14.2	22.9	0.0	0.0
	[x](0.0)	(6.9)	(3.9)	(13.3)	(0.0)	(0.0)
Two-year[w]	9.5	13.2	11.0	0.0	0.0	63.8
	(6.3)	(7.1)	(3.6)	(0.0)	(0.0)	(27.8)
Both[v]	42.2	41.1	44.6	50.7	0.0	36.2
	(10.4)	(10.4)	(5.3)	(14.4)	(0.0)	(27.8)
Neither[u]	48.4	32.5	30.2	26.4	0.0	0.0
	(10.3)	(9.9)	(5.0)	(13.0)	(0.0)	(0.0)
	[t](n=22)	(n=22)	(n=78)	(n=11)	(n=0)	(n=3)

[z] Highest educational degree completed.

[y] Universities or colleges offering four-year bachelor degrees.

[x] Standard error.

[w] Colleges or Technical schools offering two-year associate degrees.

[v] Both four-year and two-year degree programs.

[u] Do not recruit from colleges or universities.

[t] Total number of respondents per category.

Table 9e. Job position demographics.

	Position of respondents						
	Sole owner[z]	Partner[y]	Pres. or v.p.[x]	Manager[w]	Supervisor[v]	Sales/recruit.[u]	Other[t]
School types	Percentage of responses						
Four-year[s]	9.8	5.3	13.1	25.9	32.5	0.0	0.0
	[r](4.1)	(5.0)	(5.3)	(10.7)	(26.1)	(0.0)	(0.0)
Two-year[q]	11.8	17.9	7.1	11.9	0.0	56.1	0
	(4.5)	(9.3)	(3.9)	(7.7)	(0.0)	(33.7)	(0.0)
Both[p]	43.8	52.5	42.2	31.3	29.6	43.9	100.0
	(6.5)	(11.8)	(7.5)	(11.3)	(24.7)	(33.7)	(0.0)
Neither[o]	34.6	24.3	37.6	30.9	37.9	0.0	0.0
	(6.4)	(10.2)	(7.5)	11.1)	(28.0)	(0.0)	(0.0)
	[n](n=54)	(n=17)	(n=41)	(n=16)	(n=3)	(n=2)	(n=3)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[s] Universities or colleges offering four-year bachelor degrees.

[r] Standard error.

[q] Colleges or Technical schools offering two-year associate degrees.

[p] Both four-year and two-year degree programs.

[o] Do not recruit from colleges or universities.

[n] Total number of respondents per category.

Table 10. Responses of Associated Landscape Contractors of America industry members when asked to rate[z] their satisfaction with recent college graduates that they have hired or worked with in the past five years.

	Annual revenue[y] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
College graduates	Mean ratings of responses				
Average satisfaction[z]	3.53	3.56	3.30	3.51	3.75
	[x](0.75)	(0.16)	(0.19)	(0.13)	(0.12)
	[w](n = 123)	(n_1 = 27)	(n_2 = 27)	(n_3 = 37)	(n_4 = 32)

[z] Rating scale: (1) extremely dissatisfied, (2) dissatisfied, (3) neutral, (4) satisfied, and (5) extremely satisfied.

[y] Gross annual income.

[x] Standard error.

[w] Total number of respondents per category.

Table 10a. Region demographics.

	Region of respondents					
	Mid-Atlantic[z]	New England[y]	Midwest[x]	South[w]	Southwest[v]	West[u]
College graduates	Percentage of responses					
Average satisfaction[t]	3.66	3.55	3.53	3.47	3.38	3.63
	[s](0.16)	(0.19)	(0.17)	(0.15)	(0.22)	(0.17)
	[r](n=23)	(n=7)	(n=35)	(n=30)	(n=13)	(n=15)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Rating scale: (1) extremely dissatisfied, (2) dissatisfied, (3) neutral, (4) satisfied, and (5) extremely satisfied.

[s] Standard error.

[r] Total number of respondents per category.

Table 10b. Age demographics.

	Age of respondents					
	< 30[z]	30 to 39	40 to 49	50 to 59	60 to 69	> 70
College graduates	Percentage of responses					
Average satisfaction[y]	3.70	3.36	3.60	3.46	3.60	0.00
	[x](0.17)	(0.15)	(0.12)	(0.19)	(0.28)	(0.0)
	[w](n=17)	(n=26)	(n=50)	(n=27)	(n=3)	(n=0)

[z] Age categories in years.

[y] Rating scale: (1) extremely dissatisfied, (2) dissatisfied, (3) neutral, (4) satisfied, and (5) extremely satisfied.

[x] Standard error.

[w] Total number of respondents per category.

Table 10c. Gender demographics.

	Gender of respondents	
	Male	Female
College graduates	Percentage of responses	
Average satisfaction [z]	3.58	3.25
	[y](0.08)	(0.25)
	[x](n=108)	(n=2)

[z] Rating scale: (1) extremely dissatisfied, (2) dissatisfied, (3) neutral, (4) satisfied, and (5) extremely satisfied.

[y] Standard error.

[x] Total number of respondents per category.

Table 10d. Education demographics.

	Highest education level of respondents					
	High school[z]	Associate's	Bachelor's	Master's	Doctorate	Other
College graduates	Percentage of responses					
Average satisfaction[y]	3.42	3.50	3.58	3.60	0.00	3.36
	[x](0.17)	(0.19)	(0.11)	(0.20)	(0.0)	(0.28)
	[w](n=19)	(n=20)	(n=72)	(n=9)	(n=0)	(n=3)

[z] Age categories in years.

[y] Rating scale: (1) extremely dissatisfied, (2) dissatisfied, (3) neutral, (4) satisfied, and (5) extremely satisfied.

[x] Standard error.

[w] Total number of respondents per category.

Table 10e. Job position demographics.

	Position of respondents						
	Sole owner[z]	Partner[y]	Pres. or v.p.[x]	Manager[w]	Supervisor[v]	Sales/recruit.[u]	Other[t]
College graduates	Percentage of responses						
Average satisfaction[s]	3.47	3.45	3.41	3.95	4.00	4.00	3.94
	[r](0.11)	(0.22)	(0.15)	(0.19)	(0.0)	(0.0)	(0.44)
	[q](n=48)	(n=16)	(n=37)	(n=15)	(n=2)	(n=2)	(n=3)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[s] Rating scale: (1) extremely dissatisfied, (2) dissatisfied, (3) neutral, (4) satisfied, and (5) extremely satisfied.

[r] Standard error.

[q] Total number of respondents per category.

Table 11. Responses of Associated Landscape Contractors of America industry members when asked: "If you were hiring for an entry-level landscape contracting position and could choose between two candidates with equally good attitude, ambition, and work ethic, but had different skill strengths, which would your choose?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Strong horticulture [y]	68.3	68.8	77.8	83.3	44.1
	[x](3.8)	(8.1)	(7.9)	(5.6)	(8.3)
Strong business [w]	31.7	31.3	22.2	16.7	55.9
	(3.8)	(8..1)	(7.9)	(5.6)	(8.3)
	[v](n = 135)	(n_1 = 32)	(n_2 = 27)	(n_3 = 42)	(n_4 = 34)

[z] Gross annual income.

[y] Strong horticulture skills and weak business skills.

[x] Standard error.

[w] Strong business skills and weak horticulture skills.

[v] Total number of respondents per category.

Table 11a. Region demographics.

	Region of respondents					
	Mid-Atlantic[z]	New England[y]	Midwest[x]	South[w]	Southwest[v]	West[u]
Response options	Percentage of responses					
Strong horticulture[t]	63.9	72.9	73.0	76.5	40.9	67.9
	[s](9.4)	(15.8)	(7.1)	(7.5)	(12.8)	(10.3)
Strong business[r]	36.2	27.1	27.0	23.5	59.1	32.1
	(9.4)	(15.8)	(7.1)	(7.5)	(12.8)	(10.3)
	[q](n=24)	(n=8)	(n=39)	(n=32)	(n=14)	(n=18)

[z] Mid-Atlantic region includes the states DE, MD, NJ, NY, PA, and DC

[y] New England region includes the states CT, MA, NH, ME, RI, and VT

[x] Midwest region includes the states IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[w] South region includes the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[v] Southwest region includes the states AZ, NM, OK, and TX

[u] West region includes the states AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[t] Strong horticulture skills and weak business skills.

[s] Standard error.

[r] Strong business skills and weak horticulture skills.

[q] Total number of respondents per category.

Table 11b. Age demographics.

	Age of respondents					
	< 30[z]	30 to 39	40 to 49	50 to 59	60 to 69	> 70
Response options	Percentage of responses					
Strong horticulture[y]	59.0	54.8	71.3	82.3	69.9	0.0
	[x](11.6)	(8.9)	(5.8)	(7.1)	(25.0)	(0.0)
Strong business[w]	41.0	45.2	28.7	17.7	30.1	0.0
	(11.6)	(8.9)	(5.8)	(7.1)	(25.0)	(0.0)
	[v](n=18)	(n=29)	(n=56)	(n=29)	(n=3)	(n=0)

[z] Age categories in years.

[y] Strong horticulture skills and weak business skills.

[x] Standard error.

[w] Strong business skills and weak horticulture skills.

[v] Total number of respondents per category.

Table 11c. Gender demographics.

	Gender of respondents	
	Male	Female
Response options	Percentage of responses	
Strong horticulture[z]	69.2	63.1
	[y](4.1)	(10.9)
Strong business[x]	30.9	36.9
	(4.1)	(10.9)
	[w](n=117)	(n=18)

[z] Strong horticulture skills and weak business skills.

[y] Standard error.

[x] Strong business skills and weak horticulture skills.

[w] Total number of respondents per category.

Table 11d. Education demographics.

	Highest education level of respondents					
	High school[z]	Associate's	Bachelor's	Master's	Doctorate	Other
Response options	Percentage of responses					
Strong horticulture[y]	70.5	54.8	74.0	54.2	0.0	63.8
	[y](9.9)	(10.5)	(4.8)	(14.8)	(0.0)	(27.8)
Strong business[w]	29.6	45.3	26.0	45.8	0.0	36.3
	(9.9)	(10.5)	(4.8)	(14.8)	(0.0)	(27.8)
	[x](n=21)	(n=22)	(n=78)	(n=11)	(n=0)	(n=3)

[z] Highest educational degree completed.

[y] Strong horticulture skills and weak business skills.

[y] Standard error.

[w] Strong business skills and weak horticulture skills.

[x] Total number of respondents per category.

Table 11e. Job position demographics.

	Position of respondents						
	Sole owner[z]	Partner[y]	Pres. or v.p.[x]	Manager[w]	Supervisor[v]	Sales/recruit.[u]	Other[t]
Response options	Percentage of responses						
Strong horticulture[s]	71.7	75.4	61.7	57.7	100.0	43.9	100.0
	[r](6.2)	(10.5)	(7.4)	(11.4)	(0.0)	(33.7)	(0.0)
Strong business[q]	28.3	24.6	38.3	42.3	0	56.1	0
	(6.2)	(10.5)	(7.4)	(11.4)	(0.0)	(33.7)	(0.0)
	[p](n=53)	(n=16)	(n=41)	(n=17)	(n=3)	(n=2)	(n=3)

[z] Sole owner of the company.

[y] Partner of the company.

[x] President or vice president of the company.

[w] Manager of supervisors.

[v] Supervisor of employees.

[u] Full-time sales or recruiting position.

[t] Other position held than the choices provided.

[s] Strong horticulture skills and weak business skills.

[r] Standard error.

[q] Strong business skills and weak horticulture skills.

[p] Total number of respondents per category.

Table 12. Responses of Associated Landscape Contractors of America industry members when asked: "How many locations or branches does your company operate?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
1 location / branch	77.4	93.8	92.9	90.5	34.3
2 to 10 locations	16.1	6.3	7.1	7.1	42.9
More than 10 locations	6.6	0.0	0.0	2.4	22.9
	[y](n = 137)	(n_1 = 32)	(n_2 = 28)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Total number of respondents per category.

Table 13. Responses of Associated Landscape Contractors of America industry members when asked: "What is the best estimate of your entire company's (all branches included) annual gross revenue (total sales before expenses)?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Less than $250,000	8.8	37.5	0.0	0.0	0.0
$250,000 up to $750,000	19.0	37.5	50.0	0.0	0.0
$750,000 up to $2 million	31.4	21.9	39.3	59.5	0.0
$2 million or more	40.9	3.1	10.7	40.5	100.0
	[y](n = 137)	(n_1 = 32)	(n_2 = 28)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Total number of respondents per category.

Table 14. Responses of Associated Landscape Contractors of America industry members when asked: "What is the best estimate of your branch's annual gross revenue?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Less than $250,000	10.2	40.6	3.6	0.0	0.0
$250,000 up to $750,000	19.0	34.4	50.0	0.0	2.9
$750,000 up to $2 million	38.0	21.9	39.3	64.3	20.0
$2 million or more	32.9	3.1	7.1	35.7	77.1
	[y](n = 137)	(n_1 = 32)	(n_2 = 28)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Total number of respondents per category.

Table 15. Responses of Associated Landscape Contractors of America industry members when asked: "What region of the United States is your company located? If you have more than one location use your branch only."

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Mid-Atlantic[y]	17.5	9.4	17.9	21.4	20.0
New England[x]	5.8	9.4	3.6	2.4	8.6
Midwest[w]	28.5	34.4	21.4	33.3	22.9
South[v]	24.1	25.0	32.1	19.1	22.9
Southwest[u]	10.2	9.4	7.1	9.5	14.3
West[t]	13.9	12.5	17.9	14.3	11.4
	[s](n = 137)	(n_1 = 32)	(n_2 = 28)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Mid-Atlantic region includes DE, MD, NJ, NY, PA, and DC

[x] New England region includes CT, MA, NH, ME, RI, and VT

[w] Midwest region includes IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI

[v] South region includes AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV

[u] Southwest region includes AZ, NM, OK, and TX

[t] West region includes AK, CO, CA, HI, ID, MT, NV, OR, UT, WA, and WY

[s] Total number of respondents per category.

Table 16. Responses of Associated Landscape Contractors of America industry members when asked: "What was your age on your last birthday?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Less than 30 years	13.1	25.0	10.7	7.1	11.4
30 to 39 years	22.6	25.0	17.9	21.4	25.7
40 to 49 years	40.9	25.0	46.4	40.5	51.4
50 to 59 years	21.2	25.0	21.4	26.2	11.4
60 to 69 years	2.2	0.0	3.6	4.8	0.0
70 years or more	0.0	0.0	0.0	0.0	0.0
	[y](n = 137)	(n_1 = 32)	(n_2 = 28)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Total number of respondents per category.

Table 17. Responses of Associated Landscape Contractors of America industry members when asked: "What is your gender?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Male	86.9	81.3	96.4	92.9	77.1
Female	13.1	18.8	3.6	7.1	22.9
	[y](n = 137)	(n_1 = 32)	(n_2 = 28)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Total number of respondents per category.

Table 18. Responses of Associated Landscape Contractors of America industry members when asked: "What is the highest level of education you have completed?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
High school	16.1	9.4	25.0	16.7	14.3
Associate's degree	16.1	21.9	28.6	7.1	11.4
Bachelor's degree	57.7	59.4	39.3	64.3	62.9
Master's degree	8.0	9.4	0.0	9.5	11.4
Doctorate	0.0	0.0	0.0	0.0	0.0
Something else	2.2	0.0	7.1	2.4	0.0
	[y](n = 137)	(n_1 = 32)	(n_2 = 28)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Total number of respondents per category.

Table 19. Responses of Associated Landscape Contractors of America industry members when asked: "What description most accurately describes the position you now hold?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Sole owner of company	39.4	43.8	50.0	45.2	20.0
Partner of company	12.4	18.8	17.9	4.8	11.4
President / vice president	29.9	28.1	25.0	35.7	28.6
Manager (of supervisors)	12.4	3.1	3.6	11.9	28.6
Supervisor (of labor)	2.2	3.1	3.6	0.0	2.9
Sales / Recruiting	1.5	3.1	0.0	0.0	2.9
Other	2.2	0.0	0.0	2.4	5.7
	[y](n = 137)	(n_1 = 32)	(n_2 = 28)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Total number of respondents per category.

Table 20. Responses of Associated Landscape Contractors of America industry members when asked: "How many years have you been in this current position?"

	Annual revenue[z] (thousands of U.S. dollars)				
	Overall	< 250	250 - 750	750 - 2,000	> 2,000
Response options	Percentage of responses				
Less than 2 years	4.4	9.4	3.6	0.0	5.7
2 to 5 years	25.6	31.3	25.0	14.3	34.3
6 to 10 years	16.1	18.8	17.9	9.5	20.0
More than 10 years	54.0	40.6	53.6	76.2	40.0
	[y](n = 137)	(n_1 = 32)	(n_2 = 28)	(n_3 = 42)	(n_4 = 35)

[z] Gross annual income.

[y] Total number of respondents per category.

APPENDIX F. HUMAN SUBJECTS PROPOSAL - INTERVIEWS

ISU NEW HUMAN SUBJECTS RESEARCH FORM

SECTION I: GENERAL INFORMATION

Principal Investigator (PI): Kory Beidler		Phone: 515-294-2503	Fax: 515-294-0730
Degrees: M.S. candidate	Correspondence Address: 106 Horticulture Hall		
Department: Horticulture		Email Address: kmb1027@iastate.edu	
Center/Institute:		College: Agriculture	
PI Level: ☐ Faculty ☐ Staff ☐ Postdoctoral ☒ Graduate Student ☐ Undergraduate Student			

Title of Project: Evaluating the Importance of Business Curriculum for Employees Entering the Landscape Contracting Industry: A Needs Assessment
Project Period (Include Start and End Date): [*mm/dd/yy*][*05/17/04*] to [*mm/yy/dd*][*08/13/04*]

FOR STUDENT PROJECTS	
Name of Major Professor/Supervising Faculty: Dr. Jeff Iles	Signature of Major Professor/Supervising Faculty:
Phone: 515-294-3718	Campus Address: 106B Horticulture Hall
Department: Horticulture	Email Address: iles@iastate.edu
Type of Project: (check all that apply) ☐ Research ☒ Thesis ☐ Dissertation ☐ Class project ☐ Independent Study (490, 590, Honors project) ☐ Other. Please specify:	

KEY PERSONNEL

List all members of the research team including the principal investigator, his/her degrees, their position at ISU (or other organization) and role on the project, their training and most recent date of their training if known. Please use additional space as necessary. For projects involving animals, please include the veterinary, animal caretakers and technical staff. For projects involving human subjects, please include anyone who will have contact with the subjects.

NAME & DEGREE(S)	POSITION AT ISU & ROLE/SPECIFIC DUTIES ON PROJECT	TRAINING & DATE OF TRAINING
e.g., John Jones, MD, PHD	*M.D. at Mary Greeley Medical Center, Co-Principal Investigator. For animal studies please list specific duties, e.g., will perform surgery, will perform blood draws, responsible for animal care, will perform biopsies, daily monitoring. etc.*	*ISU Human Subject Training , 10/15/02; Radiation Safety Training, 10/01/02; Blood Borne Pathogen Training, 11/13/02; Eleven years of laboratory use of blood borne pathogens.*
1. Kory Beidler, BS	Graduate Student	ISU Human Subject Training 9/21/03
2. Jeff Iles, MS, PHD	Department Chair, Major professor	ISU Human Subject Training 10/27/02

FUNDING INFORMATION

If internally funded, please provide account number: [redacted]
If externally funded, please provide funding source and account number:
If funding is pending please provide OSPA Record ID on GoldSheet: 04-146
Title on GoldSheet if Different Than Above:
Other: *e.g., funding will be applied for later.*

SCIENTIFIC REVIEW

Although the compliance committees are not intended to conduct peer review of research proposals, the federal regulations include language such as "consistent with sound research design," "rationale for involving animals or humans" and "scientifically valuable research," which requires that the committees consider in their review the general scientific relevance of a research study. Proposals that do not meet these basic tests are not justifiable and cannot be approved. If a compliance review committee(s) has concerns about the scientific merit of a project and the project was not competitively funded by peer review or was funded by corporate sponsors, the project may be referred to a scientific review committee. The scientific review committee will be ad hoc and will consist of your ISU peers and outside experts as needed. If this situation arises, the PI will be contacted and given the option of agreeing that a consultant may be contacted or withdrawing the proposal from consideration.

☒ Yes ☐ No Has or will this project receive peer review?

If the answer is "yes," please indicate who did or will conduct the review: Committee members: Dr. Jeff Iles, Dr. Anne Marie VanDerZanden, Dr. Gary Koppenhaver, and Dr. Sarah Nusser

If a review was conducted, please indicate the outcome of the review:

NOTE: RESPONSE CELLS WILL EXPAND AS YOU TYPE AND PROVIDE SUFFICIENT SPACE FOR YOUR RESPONSE.

COLLECTION OR RECEIPT OF SAMPLES

Will you be: (Please check all the apply.)

☐ Yes ☒ No Receiving samples from outside of ISU? See examples below.
☐ Yes ☒ No Sending samples outside of ISU? See examples below.

Examples include: genetically modified organisms, body fluids, tissue samples, blood samples, pathogens.

If you will be receiving samples from or sending samples outside of ISU, please identify the name of the outside organization(s) and the identity of the samples you will be sending or receiving outside of ISU:

N/A

Please note that some samples may require a USDA Animal Plant Health Inspection Service (APHIS) permit, a USPHS Centers for Disease Control and Prevention (CDC) Import Permit for Etiologic Agents, a Registration for Select Agents, High Consequence Livestock Pathogens and Toxins or Listed Plant Pathogens, or a Material Transfer Agreement (MTA) (http://www.ehs.iastate.edu/bs/shipping.htm).

STUDY OBJECTIVES

Briefly explain in **language understandable to a layperson** the specific aim(s) of the study.

The two main objectives of my proposed study are:

1. **Assess and evaluate the perceptions of landscape contracting decision-makers regarding the overall effectiveness/usefulness of landscape contracting programs in preparing students for careers in this rapidly growing segment of the green industry.**
2. **Characterize the opinions and perceptions of landscape contracting decision-makers regarding business training and its relative importance within the broader landscape contracting curriculum.**

BENEFIT

Explain in **language understandable to a layperson** how the information gained in this study will benefit participants or the advancement of knowledge, and/or serve the good of society.

Providing future employees, it is important that we understand how industry leaders perceive the quality and scope of the education/training provided to undergraduates at colleges and universities. Are our graduates sufficiently prepared to assume positions of leadership with landscape contracting firms upon graduation? Currently there is no data that allows us to answer this question. This study signals that beginning of a conversation between academics and practitioners that will result in an objective assessment of landscape contracting curricula offered by institutions of higher learning across the United States.

ASSURANCE

- I certify that the information provided in this application is complete and accurate and consistent with any proposal(s) submitted to external funding agencies.
- I agree to provide proper surveillance of this project to ensure that the rights and welfare of the human subject or welfare of animal subjects are protected. I will report any problems to the appropriate compliance review committee(s).
- I agree that I will not begin this project until receipt of official approval from all appropriate committee(s).
- I agree that modifications to the originally approved project will not take place without prior review and approval by the appropriate committee(s), and that all activities will be performed in accordance with all applicable federal, state, local and Iowa State University policies.

CONFLICT OF INTEREST

A conflict of interest can be defined as a set of conditions in which an investigator's or key personnel's judgment regarding a project (including human or animal subject welfare, integrity of the research) may be influenced by a secondary interest (e.g., the proposed project and/or a relationship with the sponsor). ISU's Conflict of Interest Policy requires that investigators and key personnel disclose any significant financial interests or relationships that may present an actual or potential conflict of interest. By signing this form below, you are certifying that all members of the research team, including yourself, have read and understand ISU's Conflict of Interest policy as addressed by the ISU Faculty Handbook (http://www.provost.iastate.edu/faculty.) and have made all required disclosures.

☐ Yes ☒ No Do you or any member of your research team have an actual or potential conflict of interest?

☐ Yes ☐ No If yes, have the appropriate disclosure form(s) been completed?

SIGNATURES

_____

Signature of Principal Investigator Date

_____

Signature of Department Chair Date

PLEASE NOTE: Any changes to an approved protocol must be submitted to the appropriate committee(s) before the changes may be implemented.

Please proceed to SECTION II.

SECTION II: ENVIRONMENTAL HEALTH AND SAFETY INFORMATION

☐ Yes ☒ No Does this project involve human cell or tissue cultures (primary OR immortalized), or human blood components, body fluids or tissues? If the answer is "no", please proceed to SECTION III: APPLICATION FOR IRB APPROVAL. If the answer is "yes," please proceed to Part A: Human Cell Lines.

PART A: HUMAN CELL LINES

☐ Yes ☒ No Does this project involve human cell or tissue cultures (primary OR immortalized cell lines/strains) that have been documented to be free of bloodborne pathogens? If the answer is "yes," please attach copies of the documentation. If the answer is "no," please answer question 1 below.

1) Please list the specific cell lines/strains to be used, their source and description of use.

CELL LINE	SOURCE	DESCRIPTION OF USE

2) Please refer to the ISU "Bloodborne Pathogens Manual," which contains the requirements of the OSHA Bloodborne Pathogens Standard. Please list the specific precautions to be followed for this project below (e.g., retractable needles used for blood draws):

Anyone working with human cell lines/strains that have not been documented to be free of bloodborne pathogens is required to have Bloodborne Pathogen Training annually. Current Bloodborne Pathogen Training dates must be listed in Section I for all Key Personnel. Please contact Environmental Health and Safety (294-5359) if you need to sign up for training and/or to get a copy of the Bloodborne Pathogens Manual (http://www.ehs.iastate.edu/bs/bbp.htm).

PART B: HUMAN BLOOD COMPONENTS, BODY FLUIDS OR TISSUES

☐ Yes ☒ No Does this project involve human blood components, body fluids or tissues? If "yes", please answer all of the questions in the "Human Blood Components, Body Fluids or Tissues" section.

1) Please list the specific human substances used, their source, amount and description of use.

SUBSTANCE	SOURCE	AMOUNT	DESCRIPTION OF USE
E.g., Blood	*Normal healthy volunteers*	*2 ml*	*Approximate quantity, assays to be done.*

2) Please refer to the ISU "Bloodborne Pathogens Manual," which contains the requirements of the OSHA Bloodborne Pathogens Standard. Specific sections to be followed for this project are:

Anyone working with human blood components, body fluids or tissues is required to have Bloodborne Pathogen Training annually. Current Bloodborne Pathogen Training dates must be listed in Section I for all Key Personnel. Please contact Environmental Health and Safety (294-5359) if you need to sign up for training and/or to get a copy of the Bloodborne Pathogens Manual (http://www.ehs.iastate.edu/bs/bbp.htm).

FOR ENVIRONMENTAL HEALTH AND SAFETY USE ONLY

_____ _____

Signature of Biological Safety Officer Date

Please proceed to Section III.

SECTION III: STUDY SPECIFIC INFORMATION

PART A: PROJECT INVOLVEMENT

1) ☐ Yes ☒ No Is this project part of a Training, Center, Program Project Grant?
Director Name:
Overall IRB ID:
2) ☒ Yes ☐ No Is the purpose of this project to develop survey instruments?
3) ☐ Yes ☒ No Does this project involve an investigational new drug (IND)?
4) ☐ Yes ☒ No Does this project involve an investigational device exemption (IDE)?
5) ☒ Yes ☐ No Does this project involve existing data or records?
6) ☐ Yes ☒ No Does this project involve secondary analysis?
7) ☐ Yes ☒ No Does this project involve pathology or diagnostic specimens?
8) ☐ Yes ☒ No Does this project require approval from another institution? Please attach letters of approval.

PART B: MEDICAL HEALTH INFORMATION OR RECORDS

1) ☐ Yes ☒ No Does your project require the use of a health care provider's records concerning past, present, or future physical, dental, or mental health information about a subject? The Health Insurance Portability and Accountability Act established the conditions under which protected health information may be used or disclosed for research purposes. If your project will involve the use of any past or present clinical information about someone, or if you will add clinical information to someone's treatment record (electronic or paper) during the study you must complete and submit the Application for Use of Protected Health Information.

PART C: ANTICIPATED ENROLLMENT

Number of Subjects Total: 400 companies	Males:	Females:
Check if any enrolled subjects are: ☐ Minors (Under 18) Age Range of Minors: _____ ☐ Pregnant Women/Fetuses ☐ Cognitively Impaired ☐ Prisoners	Check below if this project involves either: ☒ Adults, non-students ☐ Minor ISU students ☐ ISU students 18 and older ☐ Other (explain) _____	
List Estimated Percent of the Anticipated Enrollment that will be Minorities:		
American Indians: 0	Alaskan Native: 0	
Asian or Pacific Islander: 0	Black or African American: 3	
Latino: 2	Hispanic: 3	

PART D: SUBJECT SELECTION

Please use additional space as necessary to adequately answer each question.

1) Describe procedures for identifying subjects (*e.g., ads, fliers, word of mouth, email list, etc.*)

The subjects were identified by using the online member list of the Associated Landscape Contractors of America (ALCA). The original list consisted of 2049 companies from which I interviewed 11 at the 28th Annual ALCA Student Career Days on March 25-28, 2004. Removing the interviewed companies from the frame, the final population size was 2038 companies.

2) Attach a copy of any recruitment material such as ad, fliers, e-mail messages, etc.

3) How will the subjects be selected? (*e.g., where will the names come from*?)

The population of 2038 companies was first separated into four different stratum based on the company's annual revenue, provided by the available membership information. To determine my sample size, a 95% confidence level and a worse case scenario proportion of a 50/50 split of the population expected to choose one of two response categories was used. With a 6.5% margin of error and a 60% expected response rate, I calculated a sample size of 387 companies. Anticipating high interest in the survey objectives and a strong response rate, yet realizing there are no similar studies of this population, I decided to round the sample size to an even 400 companies. In an extra step to insure the accuracy of mailing addresses and contact individuals, I called each company during the week of May 17th, 2004. The transcript of the general conversation is attached to this application.

4) Please list the inclusion/exclusion for subject selection and include an explanation.

No companies that are in the population will be excluded from the selection process. Any exclusion will come from the disposition that a sampled company wishes to not participate in completing the survey or the company no longer exists.

Please answer each question. If the question does not pertain to this study, please type not applicable (N/A).

PART E: RESEARCH PLAN

Include sufficient detail for IRB review of this project independent of the grant, protocol, or other documents.

1) Describe study procedures to which subjects will be exposed (e.g. for blood draws, include frequency and amount, who will be drawing the blood and their training).

N/A

2) For studies involving pathology/diagnostic specimens, indicate whether specimens will be collected prospectively and/or already exist "on the shelf" at the time of submission of this review form. If prospective, describe specimen procurement procedures; indicate whether any additional medical information about the subject is being gathered, and whether specimens are linked at any time by code number to the subject's identity.

N/A

3) For studies involving deception, please justify the deception and indicate the debriefing procedure, including the timing and information to be presented to subjects.

N/A

PART F: CONSENT PROCESS

1) Explain how the subjects will be contacted (*e.g., letter, phone, email, in person, etc.*) If the subjects are under 18, include how the parents or guardians will be approached as well.

The 400 companies in the sample will initially be contacted by phone to confirm mailing addresses and contact individuals. In the first week of July, they will receive a pre-notice letter briefly explaining the purpose and importance of my study. A week later, an envelope will arrive with a more descriptive cover letter explaining my research and an enclosed survey to complete. The survey will be self addressed and stamped with paid postage to help increase the response rate. One week after the survey is mailed out, a postcard will be sent thanking individuals that already responded and reminding the remaining companies to please respond. About two and a half weeks after the initial survey is sent out, a new list will be developed of companies that have not responded (by using a tracking number). A second cover letter and an additional survey will be then sent to the nonresponding companies.

2) Describe how informed consent will be obtained (*e.g., who will contact the subjects, how many times, etc.*) Describe in detail the entire consent process.

The study is completely voluntary, as stated in the survey booklet and the cover letter. By completing the survey and returning it in the mail, the subject has voluntarily consented to the study.

PART G: CONSENT AND ASSENT PROCESS FOR ENROLLING MINORS

1) If your study involves minors, please explain how parental consent will be obtained prior to enrollment of the minor(s).

N/A

2) Please explain how assent will be obtained from minors, prior to their enrollment. Also, please explain if the assent process will be documented (*e.g., a simplified version of the consent form, combined with the consent document).* "Assent" according to the federal regulations "...means a child's affirmative agreement to participate in research. Mere failure to object should not, absent affirmative agreement, be construed as assent."

N/A

PART H: DATA ANALYSIS

1) Describe how the data will be analyzed (*e.g. statistical package, statistical evaluation, statistical measures used to evaluate results*)

All data will be analyzed using SAS with data results first entered into Microsoft Excel. Answers to different questions will be evaluated as proportions, averages or totals depending on the desired response. Statistical differences will also be evaluated between the company's demographics and the individual's demographics.

2) If applicable, please indicate the anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:

06/01/05
Month/Day/Year

PART I: BENEFITS

1) Describe if there will be a benefit to the subject or if the benefit is to society. Please note that compensation is not a benefit according to the federal regulations.

Any industry input, collected and analyzed properly, will hopefully benefit the academic disciple related to landscape contracting so that colleges and universities can stay in touch with the current and future trends/concerns that face affiliated businesses.

PART J: RISKS

The concept of risk goes beyond physical risk and includes risks to subjects' dignity and self-respect as well as psychological, emotional, legal, social or financial risk.

1) ☐ Yes ☒ No Is the ***probability*** of the harm or discomfort anticipated in the proposed research greater than that encountered ordinarily in daily life or during the performance of routine physical or psychological examinations or tests?

2) ☐ Yes ☒ No Is the ***magnitude*** of the harm or discomfort greater than that encountered ordinarily in daily life, or during the performance of routine physical or psychological examinations or tests?

3) Describe any risks or discomforts to the subjects and how they will be minimized and precautions taken.

N/A

4) If this study involves vulnerable populations, including minors, pregnant women, prisoners, educationally or economically disadvantaged, what additional protections will be provided to minimize risks?

N/A

PART K: COMPENSATION

1) ☒ No ☐ Yes Will subjects receive compensation for their participation? If yes, please explain.

Do not make the payment an inducement, only a compensation for expenses and inconvenience. If a person is to receive money or another token of appreciation for their participation, explain when it will be given and any conditions of full or partial payment. (E.g., volunteers will $5.00 for each of the five visits in the study or a total of $25.00 if he/she completes the study. If the subject withdraws from participation, they will receive $5.00 for each of the visits completed.) It is considered undue influence to make completion of the study the basis for compensation.

PART L: CONFIDENTIALITY

1) Describe below the methods you will use to ensure the confidentiality of data obtained (*e.g., who has access to the data, where the data will be stored, security measures for web-based surveys and computer storage, how long data (specimens) will be retained, etc.*)

Data from the completed paper surveys will be immediately stored in the hard drive of Kory Beidler's computer in the Department of Horticulture. One backup copy of the data will be transferred to a USB mass storage device and keep safe in another location by the principal investigator. Both the paper surveys and the computer files will be saved until the completion of the research project, summer of 2005. At that time all data will be erased and disposed of in a proper manner.

Checklist for Attachments

The following are attached (please check ones that are applicable):

☐ A copy of the informed consent document **OR** ☒ Letter of information with elements of consent to subjects
☐ A copy of the assent form if minors will be enrolled
☐ Letter of approval from cooperating organizations or institutions allowing you to conduct research at their facility
☒ Data-gathering instruments (including surveys)
☒ Recruitment fliers or any other documents the subjects will see

Two sets of materials should be submitted for each project – the original signed copy of the application form, one copy and two sets of accompanying materials. Federal regulations require that one copy of the grant application or proposal must be submitted for comparison.

FOR IRB USE ONLY:

Initial action by the Institutional Review Board (IRB):

☐ Project approved. Date: _____
☐ Pending further review. Date: _____
☐ Project not approved. Date: _____

Follow-up action by the IRB:

_____ _____

_____

IRB Approval Signature Date

APPENDIX G. INFORMED CONSENT DOCUMENT

INFORMED CONSENT DOCUMENT

Title of Study: **Evaluating the Importance of Business Curriculum for Employees Entering the Landscape Contracting Industry: A Needs Assessment**

Investigators: **Kory Beidler, M.S. candidate at Iowa State University's Horticulture Department and Dr. Jeff Iles, major professor and Department Chair of Iowa State University's Horticulture Department**

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time.

INTRODUCTION

The purpose of this interview is to serve as a pilot study and provide important background information for a larger study using a mail questionnaire to be conducted in the summer, 2004. Each interview helps me test the ability of respondents to comprehend my questions, and provide important early feedback that ultimately will help me create a clearly worded and understandable written questionnaire. You are being invited to participate in this study because your company is a current member of the Associated Landscape Contractors of America (ALCA), an organization that values professionalism and encourages its members to work together and promote the green industry.

DESCRIPTION OF PROCEDURES

If you agree to participate in this study, your participation will be limited to a 25-minute appointment. During the appointment the following study procedures will be followed. You will be asked questions orally during a face-to-face interview and occasionally you will be shown tables and scales to help you answer. At the end of the interview, demographic questions of you and your company will be asked in written form.

Your appointment will be taped with a voice recorder for the sole purpose of confirming your answers after the interview is over. Upon completion of the data gathering and analysis of the interviews, all tapes will be erased before being discarded at the end of the research project. At any time during the interview process, you may skip any question that you do not wish to answer or that makes you feel uncomfortable.

RISKS

There is no foreseeable risk at this time from participating in this study.

BENEFITS

If you decide to participate in this study there may be no direct benefit to you. It is hoped that the information gained in this study will benefit society by providing valuable information that will enhance the relationship between the landscape contracting industry and academic departments, and eventually help provide better-prepared employees to ALCA companies.

COSTS AND COMPENSATION

You will not have any costs from participating in this study. You will not be compensated for participating in this study.

PARTICIPANT RIGHTS

Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled.

CONFIDENTIALITY

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken: Each human subject that is participating in the interview will be assigned a unique number code that will be used on all forms instead of actual names. A separate list will be kept for the duration of the research that connects the number code to the individual's name. This will only be available on one computer of the principal investigator. That computer is password protected and will only be accessed by the principal investigator. At the end of the research, this file will be permanently deleted on that computer. Any published results will be in summary form and your identity will remain confidential.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study. For further information about the study contact Kory Beidler at (515) 294-2503 or Dr. Jeff Iles at (515) 294-3718. If you have any questions about the rights of research subjects or research-related injury, please contact the Human Subjects Research Office, 2810 Beardshear Hall, (515) 294-4566; austingr@iastate.edu or the Research Compliance Officer, Office of Research Compliance, 2810 Beardshear Hall, (515) 294-3115; dament@iastate.edu

****

SUBJECT SIGNATURE

Your signature indicates that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given the time to read the document and that your questions have been satisfactorily answered. You will receive a copy of the written informed consent prior to your participation in the study.

Subject's Name (printed) _____

_____ _____

(Subject's Signature) (Date)

INVESTIGATOR STATEMENT

I certify that the participant has been given adequate time to read and learn about the study and all of their questions have been answered. It is my opinion that the participant understands the purpose, risks, benefits and the procedures that will be followed in this study and has voluntarily agreed to participate.

_____ _____

(Signature of Person Obtaining Informed Consent) (Date)

APPENDIX H. HUMAN SUBJECTS APPROVAL – INTERVIEWS

Checklist for Attachments

The following are attached (please check ones that are applicable):

☒ A copy of the informed consent document **OR** ☐ Letter of information with elements of consent to subjects
☐ A copy of the assent form if minors will be enrolled
☐ Letter of approval from cooperating organizations or institutions allowing you to conduct research at their facility
☒ Data-gathering instruments (including surveys)
☐ Recruitment fliers or any other documents the subjects will see

Two sets of materials should be submitted for each project – the original signed copy of the application form, one copy and two sets of accompanying materials. Federal regulations require that one copy of the grant application or proposal must be submitted for comparison.

FOR IRB USE ONLY:

Initial action by the Institutional Review Board (IRB):

☑ Project approved. Date: 3/9/04 04-146
☐ Pending further review. Date: _____
☐ Project not approved. Date: _____

Follow-up action by the IRB:

Rick Sharp
IRB Approval Signature

3/9/04
Date

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office of Research Compliance
Vice Provost for Research and
Advanced Studies
2810 Beardshear Hall
Ames, Iowa 50011-2036
515 294-4566
FAX 515 294-7288

TO: Kory Beidler

FROM: Ginny Austin, IRB Administrator

RE: IRB ID # 04-146

DATE REVIEWED: March 9, 2004

The project, "*Evaluating the Importance of Business Curriculum for Employees Entering the Landscape Contracting Industry: A Needs Assessment*", has been declared exempt from Federal regulations as described in 45 CFR 46.101(b)(6) according to the review and decision made by the IRB Committee.

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

To be in compliance with ISU's Federal Wide Assurance through the Office of Human Research Protections (OHRP) all projects involving human subjects, must be reviewed by the Institutional Review Board (IRB). Only the IRB may determine if the project must follow the requirements of 45 CFR 46 or is exempt from the requirements specified in this law. Therefore, all human subject projects must be submitted and reviewed by the IRB.

Because this project is exempt it does not require further IRB review and is exempt from the Department of Health and Human Service (DHHS) regulations for the protection of human subjects.

We do, however, urge you to protect the rights of your participants in the same ways that you would if IRB approval were required. This includes providing relevant information about the research to the participants. Although this project is exempt, you must carry out the research as proposed in the IRB application, including obtaining and documenting (signed) informed consent, if applicable to your project.

Any modification of this research should be submitted to the IRB on a Continuation and/or Modification form to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.

cc: Horticulture
Jeff Iles

APPENDIX I. HUMAN SUBJECTS PROPOSAL - SURVEY

ISU HUMAN SUBJECTS CONTINUING REVIEW AND/OR MODIFICATION FORM

TYPE OF SUBMISSION: ☐ Continuing Review ☒ Modification ☐ Continuing Review and Modification

Principal Investigator: Kory Beidler		Phone: 515-294-2503
Degree: M.S. candidate	Correspondence Address: 106 Horticulture Hall	
Department: Horticulture		E-mail Address: kmb1027@iastate.edu
Project Title: Evaluating the Importance of Business Curriculum for Employees Entering the Landscape Contracting Industry: A Needs Assessment		
IRB ID: 04-146		Date of Last Continuing Review:
IF STUDENT PROJECT		
Name of Major Professor: Dr. Jeff Iles		Phone: 515-294-3718
Department: Horticulture		Campus Address: 106B Horticulture Hall
		E-mail Address: iles@iastate.edu

FUNDING INFORMATION:

☐ External Grant/Contract ☒ Internal Support (no specific funding source) or Internal Grant (indicate name below)	
Name of Funding Source:	OSPA Record ID on Gold Sheet: 68148
☐ Part of Training, Center, Program Project Grant – Director:	Overall IRB ID No:

CONFLICT OF INTEREST

The proposed project or relationship with the sponsor require the disclosure of significant financial interests that present an actual or potential conflict of interest for investigators involved with this project. By signing this form, all investigators certify that they have read and understand ISU's Conflict of Interest policy as addressed by the ISU Faculty Handbook and made all disclosures required by it. (http://www.provost.iastate.edu/faculty.)

Do you or any member of your research team have a conflict of interest? ☐ Yes ☒ No
If yes, has the appropriate disclosure form been completed? ☐ Yes ☐ No

ASSURANCE

I certify that the information provided in this application is complete and accurate and consistent with proposal(s) submitted to external funding agencies. I agree to provide proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the IRB for review. I agree that modifications to the originally approved project will not take place without prior review and approval by the Institutional Review Board, and that all activities will be performed in accordance with state and federal regulations and the Iowa State University Federal Wide Assurance.

_____

Signature of Principal Investigator Date

Student Projects: Faculty signature indicates that this
application has been reviewed and is recommended for IRB review.

_____ _____

Signature of Supervising Faculty Date IRB Approval Signature

For IRB Use Only	EXPEDITED per 45 CFR 46.110(b) _____, Category _____, Letter _____ STUDY REMAINS EXEMPT per 45 CFR 46.101(b) _____ WAIVER of SIGNED CONSENT per 45 CFR 46.117(c) _____ WAIVER of ELEMENTS of Consent per 45 CFR 46.116 _____ VULNERABLE POPULATION per 45 CFR 46._____

Please answer each question. If the question does not pertain to this study, please type not applicable (N/A).

SECTION I: KEY PERSONNEL

List all members of the research team, their degrees, and the date of their most recent human subjects training certification if known. The research team includes the Principal Investigator and all other individuals (faculty, staff, or students) who have contact or interactions with research subjects or with their private, identifiable information. Investigators from other institutions with an IRB do not need to meet ISU's human subject training requirements. This application will be returned to the Principal Investigator, if all members of the research team have not received human subject training and have certification on file.

Name	Degree	Training Date
Kory Beidler	BS	9/210/03
Jeff Iles	MS and PhD	10/27/02

SECTION II: CONTINUING REVIEW

In addition to completing Section I: Key Personnel, please complete Section II if this is an application for Continuing Review. If this is an application for continuing review and you will be modifying your project in the future, please complete all sections of the form. If this application is only to request approval for a modification or change to your study, please complete Section I: Key Personnel and Section III: Proposed Modifications or Changes.

1. ☐ Yes ☐ No Is the research **permanently** closed to the enrollment of new subjects?
2. ☐ Yes ☐ No Have **all** subjects completed all research-related interventions?
3. ☐ Yes ☐ No Does research remain active only for long-term follow-up of subjects?
4. ☐ Yes ☐ No Are the remaining research activities limited to data analysis?
5. ☐ Yes ☐ No Subject enrollment has not begun and no additional risks have been identified.

(***Note**: If the answer in questions 1 – 5 is "yes" the study qualifies for Expedited Review.*)

Part A: Enrollment Status

Number of Subjects Approved by IRB:	Number of Subjects Consented to Date:
Number of Subjects Consented Since Last Continuing Review: Total: Males: Females:	
Number of Subjects Screened:	Number of Subjects Lost to Follow-up:
Check if any enrolled subjects are: ☐ Minors (under 18). Age Range of Minors: ☐ Pregnant Women/Fetuses ☐ Cognitively Impaired ☐ Prisoners	Check below if this project involves either: ☐ Existing Data/Records ☐ Secondary Analysis ☐ Pathology/Diagnostic Specimens
List Estimated Percent of the Total Enrolled That Are Minorities Below	
American Indians:	Alaskan Native:
Asian or Pacific Islander:	African American:
Black (Not of Hispanic Origin):	Hispanic:

1. ☐ Yes ☐ No Have any subjects withdrawn or have you asked any subjects to withdraw from the study?

List number for each and reason for withdrawal:

Part B: Protocol Summary – Please use the amount of space needed to adequately address the questions.

1. Please provide a concise summary of the purpose and main procedures of the study.

N/A

2. Please provide a summary of how the study is progressing (e.g., progress to date in terms of the overall study plan, success or problems encountered, reasons enrollment has not begun, etc.)

N/A

3. Is there any new information (positive or negative) from this study (e.g., interim analysis) or elsewhere (e.g., current literature) that might affect someone's willingness to enroll or continue in the study. It is especially important for the investigator to notify the IRB of literature or information that's relevant to the risks participants in the study.

N/A

4. Please provide a summary of amendments or modifications since last IRB review.

N/A

Part C: Adverse Events and Unforeseen Problems

1. ☐ Yes ☐ No Have there been any adverse events or unanticipated problems involving risks to subjects or other people?

   If yes, please give them numbers and describe.

   If yes, was it reported to the IRB? Date reported _____

   If report was not submitted, please explain why.

2. ☐ Yes ☐ No Have there been any subject complaints?

   If yes, please describe.

   Attach any reports submitted to NIH or a Data and Safety Monitoring Board. _____ Attached
   ___ N/A

Part D: Informed Consent

1. ☐ Yes ☐ No If a signed Informed Consent Form was required, was Informed Consent obtained from all subjects?

   If no, please explain.

   ☐ Yes ☐ No Are all signed Informed Consent Forms on file with the PI?

   If no, please explain.

   ☐ Attached
   ☐ N/A
   Submit copy of currently approved Informed Consent Form and an original unstamped copy. (if stamped). If changes have been made please submit the original, a copy with the highlighted changes, and a copy to be stamped with IRB approval.

   ☐ Attached
   ☐ N/A
   Submit currently approved informational letter.

SECTION III: PROPOSED MODIFICATIONS OR CHANGES

If this application is to request approval for modification or changes to your project, please complete Section I: Key Personnel and Section III.

The submission of a modification form is required whenever changes are made to an approved project. This includes but is not limited to a title change, changes in investigators, resubmission of a grant proposal involving changes to the original proposal, changes in the funding source, changes of an instrument, advertisements, reports from a data safety and monitoring board, addition of a test instrument, etc. **NOTE: All changes must be submitted and approved by the IRB prior to their implementation, unless the change is necessary to protect the safety of subjects.**

1. The following modification(s) are being made (check all that apply):

☐ Change in protocol.
☒ Change in type or total number of subjects. New anticipated total: 400
☒ Change in informed consent document.
☐ Change in co-investigator(s). New co-PI name: _____

Signature of new Co-PI: _____

☒ Change in funding source/sponsor. Please attach copy of grant proposal sent to new funding agency.
☒ Other (e.g., change in project title, adding new materials, adding advertisement, etc.)

NOTE: If the change involves a new Principal Investigator, a new Human Subjects Review form must be submitted.

2. Describe the modification(s) indicated above in sufficient detail for evaluation independent of any other documents. If the change is to the informed consent document, submit a copy of the currently approved document, one clean copy of the new informed consent document, and a copy of the new informed consent document with changes highlighted.

The initial Human Subjects application and approval for this study pertained to eleven interviews that I administered at the 28th Annual ALCA Student Career Days on March 25-28, 2004. The remainder of the study involves a survey, which is the cause for this modification document.

The population for the survey consists of 2049 companies from the online member list of the Associated Landscape Contractors of America (ALCA). After removing the 11 companies already interviewed, the remaining 2038 companies were separated into four different stratum based on annual revenue before a sample of proportional allocation could be taken. A final sample size was calculated to be 400 out of 2038 companies in the population. In an extra step to insure accuracy of the available mailing addresses and contact individuals, I called each company during the week of May 17th, 2004. The transcript of the general conversation is attached to this application.

The survey will not require participants to fill out the informed consent document provided by the Human Subjects website. Instead, a separate advance notice letter and a cover letter sent with the survey will explain to the participants that the survey is completely voluntary and confidential. As participating individuals are completing the survey, they will again be reminded that all their provided data will be for research purposes and the data will be published only in summary form.

The only other new information since the initial application is a grant proposal of $5000 to the Horticulture Research Institute (HRI). A copy of the proposal is attached.

APPENDIX J. HUMAN SUBJECTS APPROVAL – SURVEY

For IRB Use Only	Modification Approval Date 6/7/04 Continuing Review Approval Date _____ Approval Expiration Date: _____	IRB JUN 0 3 2004

ISU HUMAN SUBJECTS CONTINUING REVIEW AND/OR MODIFICATION FORM

TYPE OF SUBMISSION: ☐ Continuing Review ☒ Modification ☐ Continuing Review and Modification

Principal Investigator: Kory Beidler	Phone: 515-294-2503
Degree: M.S. candidate	Correspondence Address: 106 Horticulture Hall
Department: Horticulture	E-mail Address: kmb1027@iastate.edu
Project Title: Evaluating the Importance of Business Curriculum for Employees Entering the Landscape Contracting Industry: A Needs Assessment	
IRB ID: 04-146	Date of Last Continuing Review:
IF STUDENT PROJECT	
Name of Major Professor: Dr. Jeff Iles	Phone: 515-294-3718
Department: Horticulture	Campus Address: 106B Horticulture Hall
	E-mail Address: iles@iastate.edu

FUNDING INFORMATION:

☐ External Grant/Contract ☒ Internal Support (no specific funding source) or Internal Grant (indicate name below)	
Name of Funding Source:	OSPA Record ID on Gold Sheet: 68148
☐ Part of Training, Center, Program Project Grant – Director:	Overall IRB ID No:

CONFLICT OF INTEREST

The proposed project or relationship with the sponsor require the disclosure of significant financial interests that present an actual or potential conflict of interest for investigators involved with this project. By signing this form, all investigators certify that they have read and understand ISU's Conflict of Interest policy as addressed by the ISU Faculty Handbook and made all disclosures required by it. (http://www.provost.iastate.edu/faculty.)

Do you or any member of your research team have a conflict of interest? ☐ Yes ☒ No
If yes, has the appropriate disclosure form been completed? ☐ Yes ☐ No

ASSURANCE

I certify that the information provided in this application is complete and accurate and consistent with proposal(s) submitted to external funding agencies. I agree to provide proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the IRB for review. I agree that modifications to the originally approved project will not take place without prior review and approval by the Institutional Review Board, and that all activities will be performed in accordance with state and federal regulations and the Iowa State University Federal Wide Assurance.

K Beidler 6-4-04
Signature of Principal Investigator Date

Student Projects: Faculty signature indicates that this application has been reviewed and is recommended for IRB review.

[signature] 6/4/04 Richard Shoup 6/7/04
Signature of Supervising Faculty Date IRB Approval Signature Date

For IRB Use Only

EXPEDITED per 45 CFR 46.110(b) _____, Category _____, Letter _____
STUDY REMAINS EXEMPT per 45 CFR 46.101(b) 2
WAIVER of SIGNED CONSENT per 45 CFR 46.117(c) _____
WAIVER of ELEMENTS of Consent per 45 CFR 46.116 _____
VULNERABLE POPULATION per 45 CFR 46._____

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office of Research Compliance
Vice Provost for Research and
Advanced Studies
2810 Beardshear Hall
Ames, Iowa 50011-2036
515 294-4566
FAX 515 294-7288

DATE: June 7, 2004

TO: Kory Beidler

FROM: Ginny Austin, IRB Coordinator

RE: **IRB ID # 04-146**

STUDY REVIEW DATE: June 7, 2004

The Institutional Review Board has reviewed the project, *"Evaluating the Importance of Business Curriculum for Employees Entering the Landscape Contracting Industry: A Needs Assessment"* and has determined that it is exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) 2. The applicable exemption category is provided below for your information. Please note that you must submit all research involving human participants for review by the IRB. Only the IRB may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

The IRB determination of exemption means that this project does not need to meet the requirements from the Department of Health and Human Service (DHHS) regulations for the protection of human subjects, unless required by the IRB. We do, however, urge you to protect the rights of your participants in the same ways that you would if your project was required to follow the regulations. This includes providing relevant information about the research to the participants.

Because your project is exempt, you do not need to submit an application for continuing review. However, you must carry out the research as proposed in the IRB application, including obtaining and documenting (signed) informed consent if you have stated in your application that you will do so or required by the IRB.

Any modification of this research must be submitted to the IRB on a Continuation and/or Modification form, prior to making any changes, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.

cc: Horticulutre
Jeff Iles

ORC 04-21-04

ACKNOWLEDGEMENTS

There is a long list of individuals that have influenced different aspects and decisions throughout my life. While only a few may be mentioned below, I will never forget the others that have helped me along the way. I strongly believe everything happens for a reason.

I would first like to thank my wife, Nikki Beidler. She has been my foundation of support from the beginning. Without Nikki at my side to handle the tough decisions life has to offer, I would never be here today. She is my best friend and partner for life. These few words of appreciation can not begin to show my gratitude of her support and dedication.

I thank Dr. Jeff Iles, my major professor and mentor. Jeff gave me an opportunity of a lifetime to study and research a topic for which I have much passion. I have grown personally and professionally from the opportunities and guidance Jeff has given me.

A special thanks goes to Dr. Ann Marie VanDerZanden for her help, encouragement, and camaraderie. I appreciate the extra opportunities Ann Marie gave me to work and teach with her throughout the past two years. I also would like to thank my other two graduate committee members, Dr. Sarah Nusser and Dr. Gary Koppenhaver, for their input, time, and encouragement on my project.

I thank my parents, Carol and Bud Beidler, for their never-ending support and encouragement to reach every goal in my life, even the ones that seemed unattainable. The strong morals and ethics instilled by my parents have given me the ability to appreciate life while balancing work, family, faith, and fun. I can only hope to provide my family the same love that my parents have unconditionally given me for 28 years.

Another special thanks goes to my brother, Kyle Beidler. Since I can remember, I have strived to equal the accomplishments and abilities of Kyle. Although he has pushed me past goals I did not think were possible, he continues to provide inspiration to reach that next accomplishment. Without Kyle, my career would have never taken the course it has, and for that I can not thank him enough.

Most of all, I would like to thank God, for without Him nothing is possible.